Navigating
The Future

King County

Strategic Technology Plan
2002

Presented by:

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King County's Strategic Technology Plan represents a central component for managing and implementing core systems and infrastructure Countywide. As such, it has bearing on all agencies that rely on information systems in accomplishing their mission and day-to-day activities in an efficient and effective manner.

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Strategic Advisory Council

SCOTT NOBLE, Dept. of Assessments
DOW CONSTANTINE, King County Council
JANE HAGUE, King County Council
WESLEY SAINT CLAIR, Presiding Judge, District Court
RON SIMS, King County Executive
NORM MALENG, Office of Prosecuting Attorney
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RICHARD EADIE, Presiding Judge, Superior Court

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I. Executive Summary _____

King County made significant technology governance changes during 2001. To establish more rigor around technology advancement, operations, and management, the County determined that a comprehensive strategic technology plan was needed. The stated purpose of the plan is "to set direction for the next three years."

Prior to beginning work on the plan, the County's Chief Information Officer had already established an overarching direction for technology improvements. This direction calls for investments to shift toward integrating systems and increasing access to systems through the use of the Web. This strategic plan builds from these premises and is specifically oriented toward deploying technologies to help implement agency business plans — and ultimately to improve service delivery to the public, employees, business partners, and other governments.

Six strategic principles, presented in Section III of this plan, guide the County's 2002 Strategic Technology Plan. First is central review and coordination of information technology — the need to bring together and manage the County's technology investment more effectively with an enterprise-wide view. Second is seeing information technology as enabling more effective and efficient delivery of services whereby sound business cases precede technology expenditures and are then managed to correspond with direct and measurable performance results. Third, the establishment of information technology standards will guide all key aspects of technology resource management. Fourth is access to information and services where seamless self-service will be a standard way of conducting business. Fifth is the need for business process improvements that will conform with industry best practices. The sixth and last principle pertains to privacy and security, addressing the critical need to protect the County's information resources and the privacy of both employees and the public. The common thread unifying these six guiding principles is the migration from an agency-based environment to an integrated enterprise architecture. Each of the recommended strategies resulting from this planning effort, if implemented, will improve the County's technology environment under the direction of one or more of the guiding principles. Each guiding principle is discussed below along with the recommended strategies that most closely tie to that principle.

A. Central Review and Coordination of Information Technology

The premise behind this guiding principle is simple. The County's ability to successfully manage technology resources is dependent upon a more centralized and coordinated approach to building, operating, and maintaining current and future technology assets. The anticipated fewer redundancies and strengthened planning and resource allocation will reduce duplicative costs, help ensure compatibility of systems and result in a more deliberately focused, uniform, and cost-effective information systems architecture. Several strategies contained in this plan tie to this principle. These are:

- Develop technology design/plans for significant initiatives and projects.
- Establish a comprehensive project management program.
- Reorganize technology functions around the County.
- Strengthen technology management and delivery capabilities through specialized training.
- Consolidate hardware around the County.

B. *Information Technology as Enabling More Effective and Efficient Delivery of Services*

This principle directly relates to the need for the County to strengthen its funding and investment processes that will thereby place technology expenditures in an overall policy framework supported by effective governance processes. Technology investments should be based on sound business cases, cost/benefit analyses and measurable results – all of which should be scrutinized by the current technology governance structure. Specific effort should be made to manage disbursements in the area of legacy systems where returns are more difficult to measure and the potential for payback continues to diminish over time. The strategies related to this principle include:

- Purchase and integrate top-quality commercially packaged software wherever possible and cost-effective — and with minimal customization.
- Use broadband technology and a fully integrated PBX architecture as the future centerpiece to converge data, voice, and video transport.
- Institutionalize performance measurement for technology.
- Establish a comprehensive asset management function.

C. *Information Technology Standards*

Standardization of technology assets, methodologies, development, operations and training across the County will yield significant results in improved performance, efficiency and cost avoidance. Through adherence to industry best practices, the standards defined in the governance process will allow the County to move ahead with more effective and uniform management. The results of this more consistent and intentional approach to technology standardization will also reduce the risk related to the implementation of larger projects pending at the County. Strategies addressing this principle include:

- Utilize service-level agreements as a standard way of doing business.
- Develop standard operating procedures to guide all agencies' technology staff.
- Standardize technology including infrastructure, hardware, and applications software.
- Institute Countywide best practices for enterprise data management.
- Standardize County technical approach for application integration.
- Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.

D. *Access to Information and Services*

A core component of the business of the County is to provide access to information and services. Increased ease of use and self-sufficiency in this endeavor may be promoted though an increased use of Web-based technologies that may reduce costs associated with providing public services over time. Secure, reliable and user-friendly public information access through Internet-based methods (as opposed to walk-ins, mail and phone traffic) will position the County to serve the public in a more responsive and effective manner. Expanded use of the County intranet and extranet will also enable staff and business partners to benefit from the up-to-date and readily accessible information brought about through these technologies.

This principle is addressed in the following strategies:

- Standardize Web-based technology used on the intranet, Internet, and extranet.
- Use the Internet as a primary mechanism to deliver public information and services.
- Promote and support the development of the employee intranet and partner extranet to improve information services and business process support.

E. Business Process Improvement

The optimization and redesign of business processes used throughout the County is necessary to more quickly and completely reap the full benefits available through technological enhancement. In contrast to the current "business as usual" approach, this will provide highest and best use of staff through the improvements provided in more modern systems. The study noted several points where business processes are out of synch with the County's technology investment, thereby reducing the return on expenditures. Technology should be a part of a comprehensive business solution that would include careful business analysis and design. Strategies related to current deficiencies in this area include:

- Reorganize the help desk function around a more centralized, streamlined, and coordinated model.
- Utilize the State of Washington's Digital Academy to promote learning.
- Design and implement a common architecture to integrate workflow between law, safety, and justice agencies.

F. Privacy and Security

Privacy and security have quickly become fundamental concerns in the field of information technology. The drastically increased connectivity and collaboration that new systems provide also lead to striking oversights in protecting both the privacy of the public and the confidentiality, integrity and availability of County data and resources. It is recommended that all facets of the technology architecture and processes at the County must in some way address security and privacy. Proper technical, operational, policy and managerial improvements will significantly decrease the County's risk. While cost savings are difficult to provide short term, a more conscious and centralized approach to these issues could lead to significant avoidance of loss – both financially and in the area of public confidence. This principle is addressed in these strategies:

- Strengthen system security.
- Strengthen business continuity capabilities.

By proceeding under the six guiding principles, the County will move to the next level of effective technology usage and deployment. No single principle stands on its own in the advancement of technology, as each is reliant upon the others for success. When careful planning is consistently aligned with the business goals of the County and these principles, the County will be positioned to achieve a lasting return on technology investments. A more deliberate and intentional enterprise information systems approach based on a centralized business model will make highest and best use of current and future technology assets, and aid the County in serving the public in the most effective and efficient ways possible.

Having summarized the County's strategic technology plan in the context of the policy framework of the guiding principles, this report, in the following sections, discusses in detail the ideas presented. First is a definition of the County's vision statement — a commitment that will provide direction in technology services and design. The vision is followed by the list of guiding principles that will govern decisions in this area. Following the principles, the County's business environment is described using goals, objectives, directions, opportunities and issues from agency business plans. A comprehensive description of the County's technology environment is then presented, with findings, strengths and weaknesses covering the crucial areas of service delivery, operations, architecture, management and organization, and funding. Lastly, strategies and transition plans are presented to outline the immediate and long-term directions for the County. This document is to be used for resource forecasting and strategy and is not intended for use as an implementation plan. In aggregate, this strategic technology plan provides a recommended road map for the County to follow over the next three years to become a more successful information systems enterprise.

II. Vision

The County today is at a milestone in its technology evolution. At stake is the definition of the County's strategic technology direction. To unite the County's stakeholders and provide ongoing direction, a technology vision has been shaped to define an image of the future in terms of technology, functionality, structure, and use. This new vision has been developed through a process with input from stakeholders all around the County. The vision is aligned with agency business plans and has been composed through the views of upper management. Serving as a guidepost, the vision will help ensure that a consistent and effective approach is taken to deploy technology that ultimately brings many benefits to the public and staff.

The technology vision is packaged as a concise statement to guide the County's efforts and provide forethought related to how technology will be delivered and utilized in the best interests of the community. The vision emphasizes the importance of providing solutions that will ensure the highest level of service. The vision is also based upon the premise of continuous technology development linking all users together irrespective of location in a convergence of collaboration and service. The overarching technology vision of the County states that —

> *ALL COUNTY INFORMATION AND INFORMATION-BASED SERVICES ARE COST-EFFECTIVE, EASY TO ACCESS AND USE BY THE PUBLIC, BY PRIVATE COMPANIES, AND INTERNAL STAFF THROUGH WEB-BASED TECHNOLOGIES WITH APPROPRIATE SECURITY AND PRIVACY CONTROLS.*

III. Guiding Principles for Information Technology_____

These guiding principles provide the policy framework to promote a standard and cost effective approach to delivering and operating information technology to achieve the goals of improving:

- Efficiency
- Public access to our government
- Customer service
- Transparency of and accountability for decisions

1	**Central Review and Coordination of Information Technology**	♦ Information technology investments should be coordinated at a Countywide level to leverage development efforts, reduce duplicative costs and ensure compatibility of systems.
2	**Information Technology Enables Effective and Efficient Service Delivery**	♦ Funding approval through the technology governance structure should be based on a sound business case that documents measurable outcomes, including service delivery improvements. ♦ When assessing new software solutions, commercial off-the-shelf software packages that adequately meet the business requirements of the County are preferable to custom developed applications. The County should determine requirements and analyze both operational and financial business cases when evaluating the alternatives of building or buying new software applications. ♦ Information technology investments should be effectively managed and tied directly to service performance results. ♦ Investments in legacy systems should be limited to mandated and essential changes that can demonstrate extending the useful life of the system.
3	**Information Technology Standards**	♦ Hardware, software, and methodologies for management and development should adhere to Countywide standards adopted through the technology governance structure. ♦ Hardware and software should adhere to open (vendor independent) standards to promote flexibility, inter-operability, cost effectiveness, and mitigate the risk of dependence on individual vendors, where applicable. The County will proactively define and describe these standards in RFPs and other communications with vendors. ♦ Technology operations and project management should adhere to best practices to ensure consistency, achieve efficiencies, and maximize success. ♦ Technical staff should be provided with appropriate training to ensure effective management of information technology resources.

4	**Access to Information and Services**	♦ Information and services should be provided using web-based technology with standard navigation tools and interfaces where appropriate.
		♦ A reliable and secure communication and computer infrastructure should be provided to ensure seamless self-service access to information and services.
5	**Business Process Improvement**	♦ Industry best practices should be applied to optimize business processes.
		♦ When implementing commercial off-the-shelf software packages, the County should adopt and implement industry best practices, redesigning business processes as required in order to improve operations, minimize customization and speed the delivery of new business applications
		♦ Comprehensive business solutions should be developed across organizational boundaries to cover end-to-end business processes.
		♦ Data should be captured once and shared to reduce cost, duplication of effort and potential for error.
6	**Privacy and Security**	♦ The County should adopt and implement an effective privacy policy that articulates the manner in which it collects, uses, and protects data, and the choices offered to protect personal information within the constraints of public disclosure law.
		♦ Reasonable, cost-effective measures should be implemented to protect data, hardware and software from inappropriate or unauthorized use, alteration, loss or destruction.
		♦ Auditable security measures should be part of the initial architecture and design as information technology solutions are developed and implemented.

IV. Business Environment _____

As a first step followed in the strategic technology planning process, the County's business needs have been reviewed. These business needs were defined through review of each agency's business plans, interviews with Business Management Council (BMC) and Technology Management Board (TMB) members, surveys, and other internal County research. The business needs defined have been on a near term rather than strategic time horizon. The business goals, objectives, issues, opportunities, and directions identified anchor the planning project in terms of providing benchmarks against which the systems assessment, strategies, and plans will be developed. These components are related to one another in that goals and objectives provide a foundation from which to mobilize the development and implementation of directions and opportunities. Issues are problems or concerns that can stand in the way of an organization's ability to realize its goals or pursue opportunities. Ultimately, these business concepts will drive what technology decisions are made to move the County forward.

Results of the fact-finding work conducted in support of the technology strategic planning process revealed a number of common themes across agencies. Each of these areas is described further below, providing a summary of the lessons learned throughout this process. A table of compiled agency responses is attached as an appendix.

A. Strategic Goals and Objectives

Goals and Objectives Summary	
• Improve/Expand services • Empower employees • Manage data and information • Optimize analysis, assessment, and improvement practices	• Establish communication and collaboration • Define metrics and performance measures • Strengthen project management • Ensure greater public awareness • Increase revenues and control costs

Strategic goals for each business area directly support the mission of each respective organization. Objectives represent the specific actions that an agency strives to undertake with respect to reaching its stated goals. These goals and objectives are typically updated on an annual or longer basis, and require a concerted set of projects and initiatives to achieve and sustain over time. Ideally, goals are specific, attainable, and timely, so that demonstrated progress can be gauged. Similarly, objectives denote the action-oriented tasks that have been delineated to accomplish the overriding goals. Goals and objectives require commitment, focus, and investment to achieve, with buy-in from top levels of management to ensure that goals are implemented. The goals and objectives identified by the agencies have been derived from the business planning documents that were submitted as part of the planning process. Because goals tend to focus at a high level of the organization, there are some core themes that emerged from the agencies' business plans. These themes are introduced below, with relevant examples and variations provided as appropriate.

1. **Improve/Expand Services**

   A number of agencies had general goals related to achieving improved and/or expanded services. Components in this area included the following:

   - Providing outstanding service to stakeholders/constituents
   - Attaining service levels that are high quality and cost-effective
   - Utilizing training, technology, and resources to attain excellence
   - Providing timely and effective services

   In addition, there is clear focus on improving service delivery, or how services are provided and administered. Specific objectives relate to achieving improved, enhanced, and expanded services and were presented as discrete, measurable components. These included efforts such as providing specific new education and employment opportunities, delivering economic support for vulnerable populations, etc.

2. **Empower Employees**

   Another core value common to the organizations functioning within the County includes empowering employees. Without dedicated, knowledgeable, and committed employees, agencies cannot provide the most basic of services. Goals related to employees included addressing the employee environment in terms of being positive and productive, supplying employees with better tools and training to do their jobs, and relieving excessive workloads.

3. **Manage Data and Information**

   Not surprisingly, most agencies are facing challenges in collecting, managing, and leveraging data and systems into useful information that supports decision making and efficient business practices. Goals in this area include the following:

   - Increased data access
   - Two-way communications with stakeholders
   - Reliable, efficient, legally sound, and cost-effective databases
   - Strengthened data integrity
   - Clear information exchange between departments and with external partners
   - Information systems that work in a reliable manner

4. **Optimize Analysis, Assessment, and Improvement Practices**

   Beyond addressing day-to-day operations, agencies are hard pressed to find the time and resources to analyze processes and procedures, assess progress against goals, and plan and execute business improvements. Several goals identified in this area include the following:

   - Finding resources to conduct policy analysis and program development
   - Instituting best practices
   - Establishing project governance structures
   - Improving business processes by implementing enterprise applications

5. **Establish Communication and Collaboration**

    Partnerships and collaboration provide a foundation to leverage other organizations' strengths through synergistic relationships. These opportunities are now being explored across divisions and departments, as well as with public entities and private organizations outside of the County. Examples of goals in this category include the following:

    - Team-based initiatives
    - Committed sponsorship from executive management, other stakeholders, and end-users
    - Establishing collaborative relationships and regional partnerships that will last
    - Integrated services, products, and facilities
    - Improved cross-departmental coordination in technology and administrative services
    - Development/implementation of strong communication systems

6. **Define Metrics and Performance Measures**

    An objective noted frequently related to implementing performance measurement for the agencies. These metrics help management gauge progress against identified goals as stated in the business plans. In some cases, this objective identified particular performance metrics, while in others, the stated objective was to research and select a set of relevant measures and benchmarks.

7. **Strengthen Project Management**

    Some of the agencies identified project management as critical for achieving their goals. In general, more robust project management techniques will ensure that schedules are met, costs are not unexpectedly exceeded, and projects follow an established and agreed upon set of tasks to ensure that key activities are not left undone.

8. **Ensure Greater Public Awareness**

    In order for the agencies to achieve their stated goals, they must ensure that the public is aware of the services or information that they provide. In some cases, this revolves around marketing the services provided or increasing the public knowledge of a specific Web site. In other cases, agencies are tasking themselves with increasing public awareness of specific issues such as the Endangered Species Act (ESA) implementation.

9. **Increase Revenues and Control Costs**

    In order for most entities to remain viable and operate cost-effectively, agencies are looking for ways to recover costs and become more self-sustaining. These objectives arose with respect to identifying alternate revenue streams as well as ensuring that the current revenue streams remain viable.

B. Directions and Opportunities

Directions and Opportunities Summary	
• Implement technology initiatives • Reorganize and restructure • Improve processes • Utilize planning activities	• Integrate and establish partnerships • Utilize cost-reducing technologies • Enhance skills

Each agency is pursuing a number of projects and/or initiatives in support of stated goals and objectives. Directions represent efforts that are underway; these are the "building blocks" used to achieve goals and objectives that have been identified at a higher level. Similarly, several circumstances were noted where agencies articulated opportunities. These represent the potential to enact positive change through concerted actions or projects. Categorical submissions in this area are described in overview as follows.

1. **Implement Technology Initiatives**

   Not surprisingly, technology is being embraced as a tool to attain process efficiencies and provide expanded self-service. Initiatives noted include the following:

   • Hardware and software acquisition/development related to improving business systems
   • Providing increased access to information through technology initiatives
   • Intranet development for increased access to and sharing of information
   • Implementation of Web technologies for providing services online
   • Database development and maintenance to ensure standards and efficiency
   • Data resource management initiatives (data modeling, definitions, etc.)

2. **Reorganize and Restructure**

   Many offices are retooling. These efforts include redirecting staff efforts through reorganizations, as well as physical remodels and relocations. The following are some specific examples:

   • Technical services reorganization to consolidate efforts into a single section within the agency
   • Reallocating staff time on information-sharing activities to eliminate duplication of efforts and streamline processes

3. **Improve Processes**

   Often, existing business processes and procedures have grown organically and are not ideally suited to meet current business needs in an optimal way. Process improvement efforts seek to address these shortcomings and address high-priority, high-risk, high-cost processes through streamlined, more automated, efficient alternatives. Numerous projects underway include the following:

   • Implementation of improved business practices
   • Records management workflow improvements

4. **Utilize Planning Activities**

Projects currently being planned and monitored constitute a significant portion of the items identified in the County business plans. These activities include planning as well as performance measurement initiatives to assess progress against planned objectives. Examples include the following:

- Planning for a comprehensive, integrated regional information system
- Planning for wireless communication applications
- Building capacity (knowledge, skills, and resources) to enable strategic planning
- Building/implementing business plans focusing on innovation

5. **Integrate and Establish Partnerships**

Agencies have recognized the opportunities they have for improving efficiency by integrating efforts across agencies and departments. Those noted within the planning documents reviewed include the following:

- Achieving economies of scale through pooled procurement functions
- Improvements in customer service
- Knowledge transfer and staffing efficiencies through staff sharing/loaning programs
- "One-stop shopping" for services

6. **Utilize Cost-Reducing Technologies**

Technology-based tools and solutions are evolving in their availability and functionality. This includes both Internet- and Web-based applications, as well as increasingly sophisticated software solutions. Related to the Internet, King County agencies are quick to note that Internet use is high in the public audience. Reasonably, many agencies have articulated the opportunity Web technologies bring for improving services and efficiency. Similarly, other software tools are available to support best practices. Particular opportunities noted include the following:

- Allowing better public access to service information
- Linking County agencies to other providers of similar services
- Increased staff utilization

7. **Enhance Skills**

Training presents the opportunity to make existing staff resources even better at what they currently do. In addition, training can often provide staff with capabilities to do more than what they currently do and function more efficiently and effectively. Training opportunities delineated in agency planning efforts include the following:

- Decreasing staff turnover
- Increasing staff morale and effectiveness
- Increasing staff utilization

C. Strategic Issues

Issues Summary	
• Funding Constraints • Increased Need for Services • Training Needs • Loss of Knowledge Capital • Downsizing Staff • Partnership Challenges • Efficient/Effective Use of Technology • Adequate Resources/Facilities	• Management of Technology Development and Implementation • Demand for Increased Public Information • Dated Processes and Workflow • Changing Environment and Business Models • Need for Standards

Strategic issues represent the key challenges or problems that directly impact an agency's ability to achieve the stated mission and strategic goals. The following has been distilled from business plans and documents, and interviews with the agency management and staff, as well as surveys distributed to Technology Management Board (TMB) members.

1. **Funding Constraints**

    The Pacific Northwest region recently experienced a dramatic period of economic growth. Now the region, as well as the country overall, is facing a severe economic contraction. Increased pressure on public agencies has resulted — populations have increased, the tax base has constricted, and unemployment rates are on the rise. In addition, recent voter initiatives, as well as annexations and incorporations, have reduced revenues that support County services. Resulting budget cuts have been felt across the board, and County government is facing the need to "tighten its belt." So, at the same time when the resources available to provide public services are diminishing, the need for such services is steadily increasing.

2. **Increased Need for Services**

    County agencies must effectively deliver services that are needed by the public to maintain safety and quality-of-living standards in our community. The need for these services is increasing in the current economic environment at the same time that the resources available for delivering these services are contracting.

3. **Training Needs**

    Many agencies are faced with staffing cuts, while at the same time being tasked with delivering increased services — often to an expanding client base. Within this context, finding the resources for appropriate training for staff to provide them with the skills and knowledge they need to "do more with less" becomes increasingly important.

4. **Loss of Knowledge Capital**

   It is difficult for some public entities to maintain technology staff, given the higher salaries and benefits that are generally available in the private sector for technical skill sets. In addition, some key technology staff have recently retired from the County, taking their in-depth knowledge and experience with undocumented, custom systems with them. With this high staff turnover, agencies face the challenge of having a majority of their staff on a learning curve. Many agencies have also had the situation in which, once staff get marketable skills, they are apt to seek more lucrative employment opportunities elsewhere. As a result of this turnover, as well as the loss of staff due to retirement, the County is continually facing the loss of knowledge within its operations.

5. **Downsizing Staff**

   Most agencies are either downsizing or maintaining same-level staffing numbers to address funding reductions. Maintaining service levels while downsizing staffing levels is a challenge.

6. **Partnership Challenges**

   Agency goals are often achieved through the use of strategic partnerships established with other public agencies or private organizations. These partnerships take time to establish and manage, but may offer payback over time through increases in efficiency and synergies between entities with a shared purpose.

7. **Efficient/Effective Use of Technology**

   Information technology provides a set of tools to meet business objectives. However, if not planned and managed effectively, technology implementation will support processes and practices that create organizational imbalances such as redundant systems that require reconciliation, duplicative data entry, and increased training, support, and maintenance costs.

8. **Adequate Resources/Facilities**

   In addition to meeting core service needs, agencies are challenged to maintain the base of physical infrastructure (buildings, treatment plants, technology, etc.). This requires commitment of resources that could otherwise go to primary service delivery.

9. **Management of Technology Development and Implementation**

   Technology projects need to be coordinated to ensure that they are conducted with the right resources and that they are being created in response to agencies' most pressing business issues. Development projects may address a single agency's needs or may involve or affect more than one agency. In either case, it is important to manage each project against a clear plan that delineates the scope and extent of the project outcome.

10. **Demand for Increased Public Information**

    Many agencies provide services and information directly to the public. Having the ability to communicate effectively with the public — either to make users aware of the services that are available to them, or to provide education that helps constituents understand issues that can directly impact their quality of life, such as health, environment, and housing concerns — is an important issue for many agencies.

11. **Dated Processes and Workflow**

    Often, existing workflows have evolved organically, usually in support of older, manual processes that have been in place for as long as anyone can remember. Or processes may be implemented because they work best with the tools and systems that are available to perform them and meet the policies that have been promulgated. In some cases, processes can be streamlined without updating the information technology tools available; for example, a change in policy can sometimes facilitate the necessary change. Reconfiguring an existing process usually brings a short-term hit to efficiency as a new process is designed and implemented, and agencies are generally reluctant to make workflow changes until there is a compelling reason to do so.

12. **Changing Environment and Business Models**

    The process of implementing change is disruptive and requires careful management to avoid potential negative side effects (decrease in productivity, extended learning curve, etc.).

13. **Need for Standards**

    It is a challenge to select and implement technology standards within and across agencies. Standards, in the long run, can help to make technology use, as well as maintenance and upkeep, more streamlined. However, in the short run, there are challenges to migrating existing components onto the selected standards and a learning curve when system upgrades or different versions are rolled out.

V. Technology Environment

The purpose of this assessment is to provide a summary overview of the condition of the County's technology environment. The assessment provides a baseline against which to compare agency needs and will assist in setting the County's new direction. The assessment has been written for use by executive management in support of planning and decision making. Multiple sources of information were used to develop this assessment. The primary sources included agency business plans, technical documentation, interviews with management and staff, technical surveys, supplemental questionnaire responses, and observations of agency operations. During the County's Strategic Technology Planning project every attempt was made to collect a comprehensive set of data. While a great deal of information was provided, not all agency information was available to support the planning analysis. In some cases, agencies did not have all the information requested; some data provided did not make sense; some data was missing; and because of time constraints, the study proceeded without all information being made available. As a result of the data constraints, it is possible that some data may be in error.

The analysis is categorized into six sections: (1) commendations, (2) service delivery, (3) operations, (4) architecture, (5) management and organization, and (6) funding. Each technology component has been described in a narrative and supplemented through bulleted lists of strengths, weaknesses, and findings.

Commendations

This assessment provides a constructive critique of the County's technology environment, with a particular emphasis on areas where improvements may be made. Because of this emphasis, the assessment spends limited discussion highlighting strengths of the organization. However, it should be recognized that many strengths exist within the County's technology environment. Of the many, we list a few of the most significant here and commend the County's staff for their diligence and expertise in establishing and operating the existing environment.

1. **Staff Commitment**

    Technology staff around the County have taken ownership for operating current systems and meeting end-user needs. The strong commitment is evident in the amount of effort and hard work being devoted to the job and in favorable feedback from the user base.

2. **Technical Skills**

    Many of the hundreds of technology staff employed by the County have honed their technical skills at a high level with respect to operating existing technologies that are in place today.

3. **Recognized Need For Change**

    Management and staff are keenly aware of the need to migrate to newer, state-of-the-art technologies, including the Web. This awareness is based upon understanding of the importance of increasing efficiencies, integrating systems, enhancing service delivery to the public, sharing data, maintaining systems, and using funds more wisely.

4. **Newly Established Governance Process**

   Driven by Council and Executive demands, the new technology governance process has brought increased accountability and oversight into the technology arena. This process is already resulting in strengthened system planning and design, improved analysis, and better decision making.

5. **Computing Architecture Stability**

   Through the variety of architecture utilized, the computing power and capacity of the County's infrastructure is providing solid support to deliver information services. Key components of the County's architecture include hardware, operating systems, databases, and active electronics.

6. **Wide Area Network**

   The County's wide area network reaches virtually every employee at the County, connecting people and providing access to applications and data. The WAN is operating reliably and supports enterprise applications including e-mail.

7. **Specialized Software**

   Much of the foundation of the County's infrastructure was put into place throughout the 1980s and 1990s. This software is operating today to meet the specialized needs of individual agencies. Representative examples of specialized software are found at Transit, Public Health, and the Department of Development and Environmental Services (DDES).

8. **Enterprise Computing**

   During the late 1990s the County established a basic foundation for enterprise technology. This foundation includes the wide area network, telephony, messaging, voice mail, and e-mail. The established core infrastructure provides the basics to build upon. Recent progress has been made related to strengthening GIS capabilities.

A. Service Delivery

Service delivery is how information and technology services are provided to the public, employees, government agencies, and businesses. Several of the service delivery areas are considered to have strategic implications. Weaknesses of particular concern include the lack of the following:

- Formal agreements between service providers and customers, in which performance commitments and expectations are set and documented in the form of service-level agreements
- Coordination between the various help desk functions that are located around the County
- Knowledge about Web technologies and the resulting impact on system development and deployment
- Progress related to deployment of specific applications on the Internet providing public information and services
- Migration of the County's technology embracing the employee intranet and partner extranet.

Related service delivery discussion is also found in the Operations section of the assessment under Distribution of Technology, Maintenance/Upgrades, Technical Security, Systems Administration, Telecommunications, E-Mail Services, Voice Messaging, Data Management, Backup and Restoration, and in the Architecture section under Internet, Intranet, and Extranet.

A1. Service-Level Agreements/Performance Measurement

Service-level agreements (SLAs) are contracts that document what services are to be provided from technology personnel to end-user customers. A limited number of these agreements are in place currently at the County, covering (1) server operations, (2) LAN and e-mail,

Findings:
− Some agreements exist for key functions, including some servers and the centralized help desk.
− SLAs do not exist for most systems.
− Those that do exist are not generally actively managed.

(3) voice systems, (4) distributed computing, and (5) Web hosting. Some agreements appear to be thorough (server operations), while others are in need of improvement (LAN administration). Other areas such as mainframe, WAN, and applications support services are lacking SLAs. To the extent that SLAs exist, they vary greatly in age, formality, and use. There are a number of agencies that also have established SLAs with vendors including Finance, DSS, and Public Health. No standards exist at the County in terms of what constitutes an SLA. Further, monitoring processes are also not defined. Finally, managers report difficulty meeting commitments made in SLAs given the limited amount of resources available. Table 1 illustrates the degree to which agreements exist internally for ITS services.

Table 1: ITS Service-Level Agreements

Relevant Services	SLA in Place?	Status
Mainframe and Networking	No	No agreements in place.
LAN and Mail	Yes	Minimal and dated agreements exist but are not monitored.
Distributed System Services (DSS)	Yes	SLAs document the service to be provided and the staff hours committed to each server or application. Some customers have not signed the agreements.
Application Development and Systems Support	No	Agreements were in place in the past but were discontinued.
Help Desk	Partial	Agreements define escalation procedures; define responsibilities of central help desk and supporting agency staff.

When considering the associated function of performance measurement, it is apparent that SLA monitoring is conducted on a limited basis. In general, performance metrics are not tracked or used effectively.

Strengths:	✓	Hosted servers and outsourced services have viable agreements in place.
	✓	Service providers and many users are aware of the need for agreements.
Weaknesses:	✓	Few service-level agreements exist across the County.
	✓	Those that are in place are not actively managed.

A2. Support/Help Desk

Help desks are located centrally within ITS and also within several agencies that operate their own technology groups. Agency help desks primarily focus on support of agency-specific applications as well as desktop issues. The two largest decentralized help desks are located within Public Health and Finance.

Findings:
− Numerous help desks are in operation supporting Countywide applications, offering some overlapping services.
− Agency help desks do not coordinate efforts on an enterprise level.
− Help desk functions have developed over the years in an ad hoc manner.

Help desk personnel provide a central source of assistance to end-users. The help desks do not have extensive resources to draw upon, and as a result provide a fairly narrow scope of assistance and often miss the root cause of problems that are reported. Perhaps the most significant issue pertaining to the County's help desk is that the multiple groups are not well coordinated. The lack of coordination is rooted in the ad hoc manner in which the functions have been established. This lack of coordination misses the opportunity to optimize use of help desk resources and also the opportunity to better serve end-users. Issues that beleaguer the function include difficulties in handling concurrent calls, lack of standard procedures, and narrow skill sets, making it difficult to

service the broad array of systems operated around the County. The centralized help desk and several others are discussed further below.

a)   *Centralized Help Desk*

The centralized help desk supports all County users and operates Monday through Friday, 6:30 A.M. to 5:00 P.M. The help desk generally focuses on problem management for network messaging, telephony, and data center issues. The ITS help desk operates with three core staff and is theoretically servicing up to 10,000 end-users. Because other County agencies utilize internal help desk resources, it is difficult to verify the number of users actually supported. The estimated total call volume is 1,200 calls per month, with each call lasting an average of three minutes.

The help desk software used centrally is HEAT, developed by FrontRange Solutions Inc. The package has been extensively customized to meet County needs. Ongoing report generation and vendor support have been hampered by the customized code. The upgrade process has also been affected, which has resulted in the process being more cumbersome and time-consuming. ITS is considering converting to the standard version of HEAT to take advantage of the software's reporting and query functions.

The process followed when a request is made is as follows. Initially, when calls are received the help desk technician attempts to answer the call on the spot. If the help desk technician is unable to fix the problem, a ticket is routed through e-mail to a specific group of specialized personnel (HEAT routes these tickets automatically). The help desk assigns tickets to "groups" of technicians, not individuals. The group lead then delegates specific tasks to technicians. With the exception of staff follow-up, there is no system in place for tracking open issues or resolution. The leads are responsible for checking on open HEAT requests. Generally, technicians are not dispatched out into the field; instead, most issues are referred to agency LAN administrators for follow-up.

After-hours support requests are routed to operations staff who provide 24x7 service. For emergencies, operations staff know which technicians to contact. Operations staff enter tickets and serve as an escalation point to the technicians. There are few performance metrics against which help desk staff measure performance or shortcomings. Currently the primary unit of measure is the number of calls received per week. Information regarding actual call volumes or average length of call is not currently available for after-hours support.

b)   *Decentralized Agency Help Desks*

Public Health, Finance, the Department of Natural Resources, and the Department of Development and Environmental Services operate their own help desks. These agencies operate significant systems and support many hundreds of end-users. Specific attention is provided in these operations to supporting software applications.

(i) Public Health

Public Health operates its own help desk because of the specialty applications used, although the help desk also supports standard Countywide applications. Public Health's help desk is staffed by two full-time analysts. Issues are either resolved immediately at the desk or routed to appropriate on-site personnel. The help desk supports over 1,800 employees.

(ii) Finance

The Finance Department help desk is primarily responsible for supporting PeopleSoft software, although users also obtain assistance for Countywide applications. Support is also provided for bank financial software, Integrated Business Information Systems (IBIS), Advanced Purchasing Inventory Control System (ADPICS), and the Management Service America (MSA) system.

(iii) Department of Natural Resources and Parks (DNRP)

Each of the four divisions of DNRP provides support to its own staff:

- The Solid Waste Division help desk responds to e-mail requests for assistance. The goal of this group is to respond to requests within 30 minutes. After-hours calls from the transfer stations are responded to immediately, and office staff requests are handled on the next business day.
- The Water and Land Resources Division help desk responds to approximately 170 calls per week, with an average response time of 35 minutes. After-hours calls from the flood warning center and EOC are responded to immediately, and other after-hours calls are handled the next business day. An estimated 70 percent of the help desk calls are answered at the point of contact.
- The Wastewater Treatment Division help desk responds to calls during business hours, with an average response time of two hours. Emergency after-hours calls are dealt with immediately, and nonemergency after-hours calls are handled the next business day.
- The Parks Division help desk responds immediately to after-hours emergencies, with other after-hour calls being handled the next business day. Approximately 80 percent of calls are responded to at the point of contact.

(iv) Department of Development and Environmental Services (DDES)

The DDES help desk responds to approximately 300 calls per month, with an average response time of one business day. Approximately 75 percent of the calls are answered when person-to-person contact is made. After-hours calls are tracked by voice or e-mail and responded to the following business day. For hardware, DDES utilizes automated equipment failure notification received by the LAN Administrator/Unix System Administrator. DDES software applications are fully supported by internal agency staff. Each application is assigned a primary and a backup support staff member.

A summary of agency help desk functions is provided in Table 2. Information about the Judicial Administration help desk functions was limited to that provided in the table.

Table 2: Agency Help Desk Functions

Agency	Help Desk Hours	Tools (Status)
Public Health	7:00 a.m. – 5:00 p.m. weekdays	None reported
Finance	7:00 a.m. – 4:00 p.m. weekdays	None reported
DNRP • Solid Waste • Water and Land Resources • Wastewater Treatment • Parks	Each division has help line and e-mail notification. 7:00 a.m. – 5:00 p.m. weekdays Pager: 8:30 a.m. – 11:30 p.m., 7 days/week 7:30 a.m. – 6:00 p.m. weekdays Pager: 24 hrs, 7 days/week 8:00 a.m. – 5:00 p.m. weekdays 8:00 a.m. – 5:00 p.m. weekdays Pager: 24 hrs, 7 days/week	Help desk management software. WLRD has a help desk database and is developing a Web-based front end that will allow desktop users to submit requests and provide technicians with the flexibility to enter data from any location.
DDES	6:00 a.m. – 5:30 p.m. weekdays	HEAT (shared software with ITS)
Judicial Administration	8:30 a.m. – 4:30 p.m. weekdays	Currently searching for Help Desk software package

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Strengths:
  ✓ Standards specify response times.
  ✓ Agency help desks provide support focusing on specific applications and desktop support.
  ✓ A centralized help desk application (HEAT) is in use at ITS.
  ✓ After-hours emergency response processes are in place for many systems.

Weaknesses:
  ✓ There is limited reporting available to track and measure performance.
  ✓ Help desk boundaries and responsibilities are loosely defined across the County.
  ✓ The customization that has been done to HEAT impairs some functionality and impacts the upgrade process.

A3. Outsourcing

While no firm numbers were provided on this study, the County appears to make modest use of outsourcing as a way to access needed resources and provide services to end-users. What outsourcing has been pursued has been tactical in nature, as opposed to strategic, whereby a formal

Findings:
– Used primarily to access technical assistance and for backup analytical and managerial purposes.
– Occurs at a modest level.
– Outsourcing is used as a tactical, rather than strategic, tool.

effort was made to contract out specific categories of service. When outsourcing is used, it appears to be primarily for two reasons: the need to access technical assistance, and for backup analytical and managerial purposes. Outsourced technical services that have been acquired include telecommunications engineering and support, cabling, printer maintenance, and some aspects of I-NET operations. Over the years, outsourced services have also been procured for plans and particular analysis such as done recently in the

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Mainframe Study and Financial System Review. These kinds of services are typically acquired on an as-needed basis. Lacking at the County has been adequate cost/benefit analysis to determine what activities should remain as core competencies internally (such as an administration) versus what services should be categorically outsourced to other entities. As in most organizations, outsourcing is a very sensitive topic at both managerial and employee levels. Other counties around the country make use of outsourcing in a number of technical areas. Peer information is available in the appendix to this report.

Strengths:	✓	Some modest use occurring related to telecommunications engineering and support, cabling, and printer maintenance.
	✓	Personnel recognize that not all needed skills are available from within the County.
Weaknesses:	✓	Little formal study has occurred related to the benefits of outsourcing.
	✓	Outsourcing not viewed as a strategic means to access additional resources.

A4. Development

Significant custom software development has occurred over the years, especially concentrating on the County's largest applications. Custom-developed systems include Financials, Assessment, and Public Health Tracking, to name a few. While continuous development is occurring, the programming approaches are not as up-to-date as they could be.

Findings:
– Continuous development is occurring throughout the County on major applications.
– End-user involvement is lacking at major points in the process.
– Most development processes are routine, but not robust.

Programmers exist centrally at ITS, decentrally within other agencies, and are also hired from outside the County. Currently there are no standard development methodologies in use across the County. Techniques followed tend to be traditional in terms of developing specifications and programming. Sophisticated, state-of-the-art, user-oriented, and rigorous development methodologies are for the most part missing. Areas where improvements may be made include (1) using advanced process and data modeling techniques, (2) utilizing automated programming tools, (3) employing iterative development processes, and (4) involving end-users more extensively in design and test functions. All of these improvements would potentially strengthen program delivery in terms of timing, software functionality, and ultimately systems efficiency. System development efforts are occurring centrally as well as at the agency level and include Web applications, traditional systems, and reporting. Development is further discussed below in terms of these categories.

a) *Web Application*

ITS hosts the links to about 75 percent of the Web applications in use on County servers. Web deployment is predominately accomplished within the agencies. ITS also has its own Webmaster for application development and support. The Web applications are hosted within ITS on the 24th floor of the Key Tower, although agencies may also host applications on their own servers.

There are minimal development standards in place to guide development related to the County's intranet. All agencies have the latitude to establish their own systems. As a result, intranet Web applications are being developed by independent developers, supported by few guidelines to govern these activities. Some agencies appear to be duplicating development efforts since there is limited knowledge transfer across agency boundaries. Although development standards are largely missing across the County, there are some exceptions. Within ITS for example, development personnel generally follow standards related to "look and feel," meeting the standards for graphics, layout, etc. Subsequent to development, agencies are responsible for managing their own content. Some agencies, such as the Department of Natural Resources, also have formal Internet and intranet standards for use within agency boundaries, and development teams meet regularly to support such standards.

b) *Traditional*

Many agencies develop systems using conventional programming techniques. Larger, better-funded agencies such as DOT, DDES, DNR, and the Sheriff's Office are building custom systems. While many of the larger agencies program their own systems, many of the CX agencies rely on assistance from ITS' applications group to assist in the development process. One particularly good example of traditional development is found in the Assessor's Office, where a multiyear project is progressing to redevelop the property tax system.

Most development efforts follow conventional development techniques. Tasks include requirements definition, specification development, programming, testing, conversion, and "go-live" activities. Cleanup occurs before and after implementation. Much of the development at the County is conducted to maintain legacy systems. This means that programmers are on staff continuously coding applications. Systems such as MSA payroll and ARMs financials are in a constant state of change. The Department of Health and LS&J agencies are likewise continuing to develop their own applications. For the most part, programming is conducted by internal County personnel. For many personnel, because they know the code so well, programming has become "second nature."

While programming efforts continue in conventional form, such efforts are not cutting-edge, using more rigorous analysis and programming techniques. For the most part, conventional approaches, languages, and tools are used. Development processes have not heavily utilized end-users. Further, development has generally not been iterative; does not rely on extensive research; and lacks standards in terms of tools, approaches, and code reutilization.

c) Reports

Generally, requests for new and updated reports are due to legal requirements, business process changes, or analytical reasons. The process to request and develop reports differs based upon the type of system. For example, staff are trained to write reports for the IBIS system. Experts are available to assist end users to write queries if help is needed. In contrast, ARMS users go to the programmer to seek development of a new report, or users conduct a data extract. For the new ARMS Web-enabled reports, the Web site provides an automated means for Web-users to submit a report request.

Other than the informal request processes mentioned above, there are generally no well-defined request mechanisms in place for end-users to follow. Report requests are typically submitted to the analysts directly. Sometimes, such as in the case of ARMS Web reports, requests are logged in and prioritized based on the nature of the request and availability of resources. In the case of PeopleSoft, report requests are submitted to operations team members directly. A Web-site report request function is available for end-users. This function automatically logs requests received and supports prioritization of report development.

While standard "canned" reports are provided out of systems, reports are routinely developed across the County using a variety of development tools. The tool sets used in development are of two general types: those that are purchased in conjunction with a particular system such as Oracle, and those that are stand-alone and generic such as Excel. Within decentralized agencies, a number of tools are used. These tools range from standard report writers to stand-alone packages that are used to extract, manipulate, and present data. Agencies reported the use of the standard tools as noted in Table 3.

Table 3: Reporting Tools Utilized

Agencies	Tools				Business Objects
	Crystal	Access	Excel	FRx	
Finance	X	X	X		X
Fleet Administration	X		X		
Public Defense					
Adult and Juvenile Detention	X	X	X		
OHRM and OCR	X	X	X		X
Prosecuting Attorney's Office		X	X		
Road Services	X		X		
Metro Transit	X	X		X	X
Public Health	X	X	X	X	
DES	X	X	X		
Sheriff's Office	X	X			
Superior Court	X	X	X		
Department of Assessments			X		
Natural Resources	X	X	X		X
Judicial Administration	X	X	X		
Airport	X	X			
Budget Office					

Beside the generic reporting tools in use, many reports produced are tied to Financial and Human Resource systems. For example, the IBIS team utilizes a set of tools for developing both standard and ad hoc reports. The IBIS team utilizes two Oracle-based products, Business Objects and Noetix Views.

County reports developed are categorized into three types: system reports, user-created reports, and Web-enabled reports. Report types are further described below:

(i) *System Reports*

Most major County systems provide a set of system-generated reports. In many cases these reports have been custom developed during the implementation process. Reports are, in the case of legacy systems (ARMS and MSA), centrally generated, printed, and distributed. For the newer Financial system IBIS, and Human Resource/Payroll PeopleSoft, reports are requested at the client desktop, executed on the server, and then printed at the local printer.

(ii) *User-Created Reports*

Users have the option of using common reporting tools, such as Business Objects (with the IBIS system), PeopleSoft Query (with the PeopleSoft system), or Crystal Reports. Reporting analysts are available to provide assistance with these tools, especially when queries are needed. Users have been trained to use PeopleSoft Query, but to date, few users have generated reports on their own. Users may also go into ARMS to extract data using MS Access.

(iii) Web-Enabled Reports

Numerous reports from IBIS, ARMS, and PeopleSoft systems are also available on the Web. Users have the option of selecting their own reporting parameters with these systems. Web reporting functions are simple to use and do not require advanced training. Consequently, these kinds of report functions have been well received, and departments report a steady stream of requests for additional Web-based reports.

Strengths:	✓ Agencies are able to take care of many of their own needs through the use of Microsoft Access and Visual Basic Development capabilities.
	✓ Many simple applications are built quickly for immediate use.
	✓ Internal programmers appear very competent, with some agencies having significant numbers of staff.
	✓ Because of the work done by ITS' Web team, to date there is consistent "look and feel" for many of the County's Internet applications.
	✓ Standard reports are available with many systems, along with tools to support further development.
	✓ Recent technology focused on the Web has provided easier access to development resources, with custom report capabilities available to meet the particular needs of end-users.

<table>
<tr><td>*Weaknesses:*</td><td>✓</td><td>There is no party assigned the responsibility to manage development on an enterprise level.</td></tr>
<tr><td></td><td>✓</td><td>Countywide development standards have not been established.</td></tr>
<tr><td></td><td>✓</td><td>Minimal knowledge sharing occurs across agency boundaries.</td></tr>
<tr><td></td><td>✓</td><td>Generally, there is a lack of formal report request mechanisms to seek development assistance and access to information.</td></tr>
</table>

A5. Data Entry

Data entry occurs throughout the County as end-users input and operate applications. The majority of data entry is originated at the source with end-users. There is, however, a critical centralized data entry system in operation named Pertec. This system is important for the payroll and other applications such as

Findings:
− Both centralized and distributed data entry is occurring around the County.
− The central data entry system "Pertec" is vital to the County, particularly because it supports applications such as payroll.
− The centralized system is aging, and a process to replace it is now underway.

property tax billing. The system is accessed by dumb terminals located in Finance, Vital Statistics, Assessments, Courts, Public Health, and ITS. This system is at risk because of aging technology and a lack of hardware and software support. While the system itself is relatively small, it is tactically important because of the critical nature of the applications involved. ITS is in the beginning stages of acquiring a new system to replace this unstable hub.

<table>
<tr><td>*Strengths:*</td><td>✓</td><td>For some important systems with high transaction volumes, data entry is occurring efficiently through the use of the centralized Pertec system.</td></tr>
<tr><td></td><td>✓</td><td>Most data entry around the County occurs efficiently at the source with end-users.</td></tr>
<tr><td>*Weaknesses:*</td><td>✓</td><td>The current centralized system Pertec is at risk because of aging technology and a lack of support.</td></tr>
</table>

B. Operations

Operations are the practices employed to operate and sustain the technology environment. Several areas related to operations are considered to have strategic implications. Weaknesses of particular concern include the following:

- A lack of comprehensive asset management whereby assets are managed on an enterprise level rather than reactively within agencies
- Other than for the mainframe, few standard operating procedures are defined to guide those responsible for performing similar duties across the County
- A high level of vulnerability in the area of technology security related to internal and external threats
- A serious lack of business continuity planning, which will limit the County's ability to recover in the event that technology fails for an extended period of time

Discussion related to operations is also found in the Architecture section under Network, Servers, Telephone and Voicemail, and Applications.

B1. Asset Management

Asset management is the discipline of planning, deploying, operating, and maintaining the asset base in good working order to achieve optimum efficiency and cost effectiveness. Financial aspects of asset management include tracking purchase costs, asset life, depreciation, and disposition data.

Findings:
− There are some limited agency processes and workflows in place to manage technology assets.
− The current tools utilized for asset management do not include capabilities for monitoring financial expenditures.
− Concentration of activities has been oriented toward inventorying and theft prevention.
− Some asset management tools are being utilized, including SMS and ZenWorks.

Very limited technology asset management is occurring around the County. This is especially noticeable when evaluating how servers and PC workstations are managed at ITS and within other agencies. It is apparent that limited planning is occurring to ensure that systems are adequately maintained after initial capital purchases are made. Hundreds of pieces of technology are left to age and operate with less than adequate attention. The lack of maintenance is costly in terms of the highly variable repair costs as well as lost productivity. Additional equipment that appears to be undermanaged includes PBXs and voice-messaging systems. Current asset management mainly involves inventory and theft prevention activities but does not include tracking depreciation or planning replacement.

Over the years, some attempts have been made to improve asset management. For example, within ITS there have been previous attempts to use Microsoft's Systems Management Server (SMS) to deploy and manage the County's software, but full implementation has never occurred because of the complexity of the software and network topology requirements. SMS is a software application primarily utilized for remote software deployment as well as for managing software and hardware assets. This tool may be utilized for asset management functions including discovering and tracking assets, deploying applications and software updates, as well as troubleshooting Windows-based systems. ITS has used SMS for some inventory management, but because SMS does not include cost or depreciation tracking, most of the more expensive capital equipment (e.g., switches, PBXs, etc.) are tracked through the use of stand-alone spreadsheets.

Additional asset management activities also occur within other agencies. For example, as part of the GIS consolidation that occurred in 2001, a "ground-up" GIS asset inventory was developed. This inventory is expected to be used as a basis for a better-managed asset replacement program in the future. Inventory is also tracked through both accounting functionality and an "internal list." Additionally, Transit uses Zenworks to support its annual software inventory process. In other instances, such as in the Department of Assessments, there is an asset management process that utilizes tracking tags and conducts annual inventorying, but does not utilize systems for tracking purposes.

Strengths:	✓ ITS is aware that asset management is conducted at minimal levels and is taking steps to improve the situation.
	✓ Some agencies are actively tracking assets at reasonable levels.
	✓ Physical protection of assets has been a priority.
Weaknesses:	✓ There is no Countywide asset management program in place.
	✓ There is no "one central source" for conducting asset management and no standard practice for planning for replacement.
	✓ There is a lack of understanding of the basic purpose of such a program.

B2. Business Continuity

Business continuity planning related to technology is seriously lacking at the County. While data backups exist, there are few plans in place that provide an adequate avenue to recover processing and communication capabilities should systems

Findings:
− Plans and preparation are lacking.
− There is significant downtime exposure.
− No alternative site is available in the event of a disaster.

go down for an extended period of time. A proper business recovery plan should include disaster recovery for data and system restoration as well as a means for establishing the continuity of such mission-critical functions as payroll, public relations, emergency response, and transportation. A review of the ITS backup plan confirmed that the disaster recovery area has not received much attention in recent years. A prime example of the lack of preparedness is that no alternative facilities are available to support the County in the event of disaster, nor is there adequate redundancy in hardware. Disaster recovery planning should be considered critical for the service centers, mainframe and servers, telephony infrastructure, and networks. Recently a subcommittee of the Technology Management Board has been formed to address disaster recovery and prepare a new plan. The new plan will identify which platforms are mission-critical and the priority of applications for recovery purposes.

Strengths:	• Agencies are aware that disaster recovery is a weakness and have immediate plans to address it.
	• A subcommittee has been formed to review and update the disaster recovery plan.
	• There is a previous but inadequate plan in place.
Weaknesses:	• Current plans address data only. Hardware, infrastructure, telecommunications, and mission-critical operations are not covered.
	• No agency has been assigned or taken ownership/responsibility for Countywide planning.
	• No needs analysis has been performed to identify which operations should be included.

B3. Distribution of Technology

Technology distribution is associated with the update process whereby software and hardware are sent or "distributed" into agency environments. The process involves acquiring, preparing, and disseminating technologies out to where they are needed. For ease of access, many agencies use standard procurement contracts negotiated by Finance/Purchasing. In addition, the

Findings:
− Standard processes are not in place.
− Agencies may opt to handle distribution independently.
− Software distribution is largely manual and inefficient.
− Some standards/contracts are in place to support hardware distribution.

County uses WSCA and other state contracts to procure and obtain products and services at a volume discount. Discussed below are the processes related to hardware and software distribution.

For the most part, hardware distribution involves procuring and installing desktops, laptops, and peripherals. Within ITS, purchases are made according to a standard procedure. The need must be justified and funded, and the request must be reviewed internally before being forwarded to purchasing. ITS uses six master contracts (Gateway, Dell, etc.) for supplying hardware. ITS' standard server hardware is Compaq, and the laptop standard is Toshiba. Desktop purchasing goes out to bid. While in many cases there is no formal standard PC replacement schedule, lifetime of a machine at the County is generally reported to be three to five years. At the agency level, departments have the autonomy and flexibility to procure and deploy hardware as deemed necessary. There are limited standards in place to guide this process or to require cross-agency coordination where excess capability may be leveraged.

A similar acquisition process is in place for software. Distributed computing supports all of ITS and about 700 other County employees from other agencies (typically, smaller agencies without support staff). To the extent that standards exist at this level, they are ad hoc and for the most part undocumented. Software is primarily distributed in a manual format whereby technicians physically attend to each machine by loading applications with a floppy disk and/or CD. This is a time-consuming process and lacks control over how software is installed. ITS employs Microsoft's Systems Management Server (SMS) to assist in the process to a limited extent. This tool may be used for centralized software deployment and inventorying, as well as remote control functionality for conducting troubleshooting activities and providing end-user assistance. Currently, the County is using this tool for some inventory functions and limited remote control capabilities, but is not using any of the SMS' "software push" capabilities at this time. The software distribution process is generally initiated by a request submitted to the ITS help desk. The request is then escalated to the appropriate agency LAN administrator for closure.

ITS' Technology Operations section was intended to be a central point for licensing of software, but this has not been a standard practice because many agencies prefer to handle standard software updates independently. This independence has created a problem in that multiple software versions are deployed across the County. For example, the Transit desktops are running on various operating systems; including Windows 95, Windows 98, and Windows 2000, and there are different versions of Microsoft Office in use. This makes for logistical difficulties when trying to distribute upgrades to the various users on the network.

Strengths:	✓	Technical staff have the know-how to strengthen distribution processes.
	✓	Some master contracts are in use to supply hardware.
Weaknesses:	✓	Manually intensive processes are utilized around the County.
	✓	Standard processes for distribution are largely missing.
	✓	Various versions of the same software are in use throughout the County.

B4. Standard Operating Procedures (SOPs)

Standard operating procedures are formally defined and documented activities related to how operations, data, records, and maintenance will occur. SOPs are typically codified in manuals available to those who are involved with technology, including managers, technicians, and end-users. As

Findings:
− Standard operating procedures are largely missing.
− Benefits can be obtained from creating and implementing Countywide SOPs for enterprise functions.

with many other types of documentation, SOPs are largely missing at the County. Mainframes are an exception, as the de facto standards and procedures in place are largely up-to-date. Mainframe SOPs have been developed specifically to control application operations and modifications, and to support structured workflows and processes.

Another area in which efforts are underway to create and enforce SOPs is within GIS. Specific focus is on developing a detailed GIS Operating and Maintenance Manual (O&M) for all County GIS operations. It is expected that the GIS O&M plan for 2002, containing procedures, will be largely completed in the spring of 2002. Efforts will then focus on updating the document as a planning tool for 2003 budgeting and Countywide GIS implementation.

Strengths:	✓	Mainframe documentation is fairly up-to-date.
	✓	Substantial efforts are underway to create SOPs for GIS operations.
Weaknesses:	✓	SOPs around the County are mostly nonexistent.
	✓	Agency personnel often do not recognize the benefits of conducting business in a standard manner.

B5. Maintenance/Upgrades

System maintenance includes preventative maintenance activities as well as repairs to address problems and computing malfunctions. Maintenance agreements exist in some cases, with major system vendors including for packaged software. Some contracts, such as with ESRI are centrally managed, while most others are

Findings:
– There are few processes and tools in place to support hardware and software maintenance and upgrades.
– Standards are needed to help reduce the complexity of processes.
-- Maintenance and upgrade activities should be tied to an overall asset management function.

the responsibilities of the particular agencies involved. Many of the existing contracts are considered problematic by the County's lawyers and are regarded as generic and outdated. In addition, many contracts are month-to-month and are assumed to be more expensive than longer-term annual agreements. Overall, maintenance agreements typically have not been structured to provide adequate protection for the County.

Maintaining software applications and hardware is challenging in terms of time and cost. Because many applications have been developed internally, they have not been routinely updated, in contrast to commercial off-the-shelf packages. Legacy systems are particularly problematic because the underlying code requires constant attention. From a hardware standpoint, most servers around the County are not under maintenance contracts and as a result receive only periodic attention. Likewise, PCs are not under contract, and network administrators take care of these machines on an as-needed basis. While maintenance is provided day in and day out, the overall scope of function requires increased management.

In contrast to maintenance, which is required to keep systems operational in a current state of functionality, upgrades are used to increase the level of functionality. Upgrades are needed and routine for many types of hardware and software. Servers are the primary types of equipment upgraded; PCs and other peripherals are maintained through an operating lifespan and then replaced. Agencies have the autonomy to upgrade systems as deemed necessary.

Because software upgrades are handled on a local basis, these efforts often lack coordination. Major packages are upgraded when agencies cannot wait any longer and have budgets to support the process (e.g., pending upgrades to PeopleSoft and IBIS). Perhaps the most significant upgrade area requiring attention, because of significant costs and productivity impact, is in the area of network operating systems and desktops. Because of the various versions of software and the number of servers and PCs operating, this area is very involved and typically requires central orchestration to be optimized. Slowly, some progress is being made in this area. There is now an enterprise agreement in place with Microsoft to assist in pending upgrades, and a centralized process for deployment has been defined. Utilizing this agreement for accessing software upgrades at a reduced cost will allow the County to realize savings over the two-year term of the agreement. Agencies may opt to use the agreement if they desire to obtain upgrades. Under this model, ITS will purchase the software and then distribute it to the agencies as needed. Agencies have indicated that they had a limited window of

opportunity for joining this agreement, and that the cost structure was not as cost-effective as hoped for in agencies that were upgrading existing licenses.

In addition to these software upgrade efforts, there are a limited number of equipment replacement programs in place for hardware. Agencies report that PC equipment is expected to operate over a three-to-five-year time frame and then be replaced as the need is perceived. Some agencies, such as Transit, have formal equipment replacement programs — PCs are replaced every four years, as are servers.

In general, until more resources are allocated to the upgrade function, comprehensive major benefits involved in asset management will not be realized. The upgrade function should be managed in tandem with maintenance.

Strengths:	✓ A centralized process for deploying software has been defined.
	✓ ITS has negotiated an enterprise agreement with Microsoft to support the upgrade processes.
Weaknesses:	✓ Standards are sometimes developed but are not enforced.
	✓ There is no enterprisewide solution in place for managing maintenance and upgrade processes.
	✓ The County does not have formal programs established for sizing, selecting, and ordering equipment.

B6. Technical Security

Procedures that protect the confidentiality, integrity, and availability of County data from both external and internal threats are limited in scope. While there has been some movement toward decreasing the level of security exposure, no integrated plan has been developed. Technical security components include perimeter, remote and

Findings:
− Some vulnerability exists to internal and external threats.
− Firewall protection is not as robust as it should be to protect the WAN.
− Limited enterprise security management is occurring.

wide area network; network operations and access controls; virus protection; and management. Existing conditions in each of these areas are described below:

Perimeter Security, Remote Connectivity, and the Wide Area Network— The perimeter security countermeasures taken to protect the County from Internet-based risk are deficient. While some of the shortcomings relate to the County's inability to know if there has been a compromise, others relate to the lack of measures taken to protect the County from external threats. Specifically, there is no host-based or network-based intrusion detection system (IDS) in place, which means that the County does not currently have a way to look for and identify malicious activity on the organization's network. Consequently, external and internal threats can attempt to access multiple times undetected, refining their efforts each time. This creates the potential for hackers to access King County's systems and/or data, make changes to it, and/or use County systems to launch an attack on another organization.

The lack of an IDS is significant for three reasons. First, the County has a number of Microsoft IIS Web servers behind the firewall but not installed on "sacrificial networks" or DMZs. Because the Microsoft product is one of the most vulnerable hosts on the market, these servers should be placed on properly configured sacrificial networks, and traffic between these devices and the County LAN should be routed through a firewall. Second, management reports that the County's perimeter may be inadequately secured with an excessive number of open ports. Because there is no record of authorized recent penetration scans, the effectiveness of the firewall to specific hacker attacks is untested. Third, with the lack of firewalls between subnets, a skilled and malicious user who has gained access to a single location on the WAN can attempt access to any host on the distributed network. Clearly, the lack of adequate perimeter security and a means for monitoring potentially malicious network traffic on the WAN should be remedied without delay.

Remote access is also a vulnerable area for the County. Significantly, while Microsoft Remote Access Services (RAS) is in use at the agency level, it is forbidden by earlier County policy. These "back doors" into the system may not be adequately monitored and audited. Also lacking is a centralized inventory of remote access users (with associated IP addresses and method of connection) that can be compared with actual user activity of remote access into the County. This inventory would enable tracking of usage and could be invaluable if an attack were to be identified. Like firewall design, there should be limited and monitored means of access into the network, and these access points should be centrally managed.

Network Operations and Access Controls — The County's decentralized IT management model, large number of servers, and some 60 different domains make security of network operations and access challenging. For example, the Application Development and Systems Support (ADSS) group manages security for the external Web servers by installing patches, software, etc., to ensure there is adequate security in place at the agency level. However, if an agency opts not to have the ITS ADSS group manage their server, they are assigned to a different network segment and are responsible for their own updates, security, and support. This is not an effective solution because a single compromised Web server can act as a point of entry into the entire organization. Because different agencies are responsible for managing the security aspects of their own networked systems, and because there is no set of Countywide guidelines, the level of protection for particular servers and hosts is inconsistent. Also, current operations do not include methods for adequate logging of potentially harmful Internet or e-mail activity, governance over internal security controls, or internal intrusion detection.

Virus Protection — ITS has an adequate virus protection process. However, there is no uniform virus management method outside of ITS, and other agencies have varying levels of security in place. Some, such as Transit, report using ZenWorks to automatically push the latest version of McAfee to each client desktop with each network log-in. Again, the decentralized structure means that some network systems are more protected than others from the virus threat.

Management — Having a decentralized model for security makes governance over security concerns difficult. While there are members of the organization with a substantial interest in securing County assets, the lack of security policies, procedures, and management means that controls over the system are quite limited. Currently the parties who are responsible for particular segments of technology are also responsible for related security over data. For example, separate personnel are managing security for particular Web applications, servers, and the firewall. This approach is fragmented, with limited attention being paid to the enterprise. Further, no current comprehensive security plan is in place, nor is there a management process established to oversee the function.

Strengths:	✓ Agencies have been conscientious about keeping both the desktop and e-mail virus protections up-to–date.
	✓ Security is of considerable concern to key management.
	✓ The County has a de facto policy on Web security.
	✓ It appears that the County has not yet experienced a costly compromise of its systems.
Weaknesses:	✓ There are a variety of different desktop virus packages in use throughout the County making it difficult to have centralized monitoring and coordination.
	✓ With multiple different technologies in use and the number of people involved, it is difficult to track and monitor exactly what protection exists.
	✓ The geographic dispersion of the servers makes it difficult to maintain a security standard across the County.
	✓ Perimeter security is weak.
	✓ Intrusion detection and regular penetration testing are not standard practices.
	✓ Security staffing and management oversight are limited.
	✓ Security policies and plans are extremely limited.
	✓ VPN and RAS are potential "back doors" and are not adequately monitored or controlled.
	✓ The internal WAN is not secured through firewalled subnets.

B7. Systems Administration

Systems administration is an ongoing, day-to-day function as networks, servers, and workstations are actively operated and maintained. Administrative tasks include basic operations, light maintenance, and fine-tuning systems. The staff involved include system administrators at central sites and network administrators scattered throughout the County. Systems administration is currently provided at

Findings:
− Administration responsibilities are assigned to technicians throughout the County.
− Decentralized administration begins to degrade as fewer people are involved.
− System administration efforts include a centrally managed domain structure, as well as efforts underway at specific agencies.
− More formal standards and guidelines are needed to support the efforts.

mixed levels. There is a general correlation between decentralized agencies and questionable administrative performance in terms of personnel assigned, available expertise, and resulting tasks being completed. The technologies that are being administered within the County and the manner in which administration occurs are discussed below.

A key part of systems administration is provided centrally by ITS. The department staffs a data center 24 hours per day, 7 days per week. Services include mainframe operations and production control, data entry, and operating the after-hours help desk. The data center was established many years ago and is supported by 20 staff. Some of the data center's larger customers include the Assessor, Treasury, Payroll, and Elections Departments. The ITS data center is currently working to set criteria for equipment that can be stored on the data center floor. The intent of this determination is to create additional space, maximize its use, and provide overall cost savings for the County.

With regard to e-mail administration, current servers are operating on Microsoft NT 4.0. ITS owns and operates all of the e-mail servers and operations; mail services consist of four Exchange servers with approximately 3,000 mailboxes each. Four other servers perform different e-mail functions, including one server processing Internet e-mail, one spare server, one NetIQ server, and one LISTSERV server.

In addition to the central data center and e-mail, the network is also administered centrally by ITS. Although ITS has the authority to limit or consolidate log-on domains, some 60 different log-on domains have been established to date. To address the complex network administrative tasks that accompany having so many distinct domains, the County is in the planning stages of migrating to Windows 2000 with Active Directory. This will force a revised hierarchical domain structure to streamline and simplify systems administration. There has been some resistance to the creation of a single domain from agencies because of concerns about centralizing control over networks that are currently managed at the agency level. In an effort to collaborate with other agencies on this upgrade, technology government launched a Windows 2000 project team that includes representatives from the different agencies. This team-based approach is preferred in that it strives to foster cooperation across the agencies. As part of the Windows 2000 project, the County is planning to implement three domain controllers (downtown, Kent Justice Center, and King Street). DNRP has set up a simulation Windows 2000 Active Directory in the Microsoft lab to test the team's technical projections.

Decentralized data centers are also operated in conjunction with the support services provided by the various technical support staff employed. For example, DNRP operates four divisions, each with its own data center and support staff. In addition, technical support staff are assigned to operate the supervisory control systems at the wastewater treatment plants. In total, over 1,600 users are supported through the various DNRP data centers.

Hardware and software is administered on a decentralized basis all over the County. For example, numerous agencies have opted to administer their own servers partly because of concerns about ITS' high costs. Some agencies, including Transit, use a mix of resources to administer systems. While the majority of Transit's servers are located at South Jackson Street Center, others are scattered at various locations, including Key Tower and other transit bases. There are approximately 30 servers at all locations. Transit is considering reducing the number of remote servers from eight to two or three. The users of these servers would then access files and print resources over the WAN. All but one of Transit's LAN administrators are located at South Jackson Street.

Strengths:	✓	The County has formed a Windows 2000 migration team to work together on implementing a new domain structure.
	✓	The County is working with Microsoft to ensure that a correct domain structure and a successful migration are planned.
	✓	County mail services are consolidated in one location.
	✓	Departments report that ITS provides good administrative technical support and that customer service has been acceptable and is improving.
	✓	Maintenance administration occurs continuously as systems are maintained.
Weaknesses:	✓	Systems administration procedures and efforts vary from agency to agency.
	✓	There is no "final" authority assigned over the County's network domain structure, or for other hardware and operating systems in general.
	✓	Sixty-three different log-on domains cause confusion and difficulty in locating resources. With 63 domains, there are potential security and vulnerability issues.

B8. Documentation

Documentation falls into two categories, technical and end-user. From a technical standpoint, documentation has been developed in an ad hoc manner with much of it lacking. In general, the responsibility for documentation falls to those managers and lead individuals who feel it is important to produce. The County has no standards for documentation, nor a repository, nor an index of sources. Much of

Findings:
– Few resources are made available/assigned to produce documentation.
– This is a low risk but understated area of importance.
– What exists is often out-of-date.
– End-user and technical documentation both are limited in availability.
– Documentation is not mandated as a requirement of development, implementation.

what is available is dated. In addition, the documentation that does exist is not well tracked. Additionally, existing technical documentation is not well disseminated to those who need access to it for instructional or support purposes. Personnel have little time to produce documentation, and the function appears to be a low priority for most agencies. Some adequate documentation exists in the areas of major applications, especially for those applications provided by third-party vendors.

End-user documentation is often in the same condition but is available in some agency environments. End-users are often not familiar with the availability of formal written instructions as a general source of support. Table 4 indicates the degree to which end-user documentation was reported to be available and complete by agencies participating in this study.

Table 4: User Documentation Availability

Agency	End-User Manuals Available	Relatively Complete
Information Resource Management		
Office of Human Resources Management		X
Adult and Juvenile Detention		
Natural Resources and Parks		
Judicial Administration	X	
Airport	X	X
District Court	X	X
Fleet Administration	X	X
Roads Services		
Metro Transit	X	X
Prosecutor		
Public Health	X	
Finance	X	X
Development and Environmental Services	X	X
Superior Court	X	X
Information and Administrative Services	X	
Sheriff's Office	X	X

Strengths:	✓	There is an awareness within ITS and other agencies regarding the lack of documentation, particularly regarding SOPs.
	✓	Numerous agencies have developed end-user manuals, with some being reasonably complete.
Weaknesses:	✓	No documentation standards exist across the County.
	✓	Documentation is sporadic; where it exists, it is not necessarily complete or up-to-date.
	✓	There is no documentation requirement for procedures, system configurations, agreements, etc.

B9. Telecommunications

The Voice Network group administers telephones Countywide, supporting 17,000 lines, cell phones, and pagers. Agency personnel notify this central group in ITS when phone service changes are needed. Currently, there is no telemanagement system or software in place to monitor directory assistance, long distance, etc. The Voice Network group is frequently asked to provide metrics in these areas, but none are available.

Findings:
– The County's voice communications services meet the basic requirements of users.
– There are many elements of the existing legacy systems that can reliably deliver continued services.
– There is a clear opportunity to exploit existing investments while migrating to a more fault-tolerant, reliable system that can deliver state-of-the-art technologies.

For vendor-supplied cell phones and pagers, the County uses state contracts managed by the Voice Network group. As part of the 2002 budget plan, there is a provision requiring the group to investigate contracts to make sure best value is being obtained. In an overall effort to stabilize the environment, ITS has issued a Request for Proposal to develop a three-to-five-year plan for migration to a more manageable system.

For basic phone services, County employees are served dial tone via Qwest-provided and -maintained Centrex services, supplying approximately 6,700 Centrex lines (DMS 100/Seattle 06), either direct to a desktop telephone set or through County-owned PBXs and key systems. Long-distance access is provided through the State of Washington SCAN network. The County's network of NEC, Fujitsu, Nortel PBXs, and key systems are connected to the Public Switched Telephone Network (PSTN) via leased services from local exchange carriers (Qwest and Verizon). With few exceptions, the voice-switching systems are disaggregated end points that allow inter-County office communications via the local exchange carrier switch only. These voice switches are not privately networked.

Overall, the County's voice-switching systems have evolved into a disaggregated collection of disparate, distributed systems without integration, network transport efficiency, or a capability to deliver contemporary applications. The distributed network is based upon three proprietary types of PBXs and multiple, limited-function key systems with autonomous interconnected voice mail systems. The disparate collection of systems prevents deployment of practical call detail recording, standardization of unified messaging, voice over IP (VoIP), or other advanced applications.

Strengths:	✓ Voice-switching services have been consistently reliable.
	✓ County employees are generally satisfied with their service.
	✓ Voice mail largely meets or exceeds manager expectations.
	✓ Basic voice mail features such as automated attendant and message-waiting indication are provided.
	✓ The County leverages from contracts at the State.
Weaknesses:	✓ There is a critical single point of failure, without redundancy at the Qwest Seattle 06 Central Office.
	✓ The multiple proprietary voice-switching systems are not integrated.
	✓ Multiple voice mail systems serve isolated work groups and do not support integration with other voice mail systems.
	✓ Unified messaging is not supported by existing systems.
	✓ The County has not set user standards for functions and features of voice services.

B10. E-Mail Services

The Countywide messaging system reaches virtually every County employee that has a computer with relative ease. ITS runs all electronic messaging in the County with Microsoft Exchange on NT 4.0 servers. There are eight Exchange servers: one for Internet e-mail, one spare server, one NetIQ server, one list server,

Findings:
– Overall messaging in the County is provided at reasonable levels.
– ITS is using industry-standard software for the messaging structure.
– Highly trained staff provide training on a proactive basis.

and four exchange servers. Each Exchange server has an internal DLT drive (35/70 – 7000 drive) and is backed up with Veritas software (Backup Exec). Backups are completed independently using 70 GB tapes. The process typically takes over 12 hours. ITS maintains one week of Exchange backups on site for discovery purposes.

The staff of seven messaging administrators have been effective in promoting mostly seamless usage of the e-mail system across the enterprise. Some capacity challenges exist in the system. For example, servers are currently handling over 3,200 accounts per server, which is stretching the performance capabilities of the existing system. E-mail storage is set at an unusually low storage capacity on a per-user basis, which results in a high level of support and maintenance requirements of user accounts. A Microsoft Technical Account Manager (TAM) is scheduled to conduct an assessment for converting to Exchange 2000, a component of which is a review of this storage limit. Rapid growth of messaging is currently the biggest challenge related to e-mail. The County relies heavily on e-mail communications; messaging support is recognized as a significant portion of help desk calls.

Strengths:	✓ E-mail services are consolidated at one location.
	✓ There is a strong e-mail structure in place with adequate support and training.
	✓ The County is taking proactive measures with Microsoft to manage the ITS e-mail backbone.
Weaknesses:	✓ A small user storage limit exists and does not fit all users' needs.

B11. Voice Messaging

Eighty percent of the County's voice mail is located on one aging server. The other voice mail is handled by other systems that are not integrated, thus impairing the level of communications that may exist. An example of such disintegration is an agency with employees in multiple

Findings:
– Basic messaging is generally available all around the County.
– Systems lack integration, inhibiting effective communications.
– A project has just recently begun to unify systems.

locations who must manually dial different systems to leave messages for each other. Because the County's voice mail systems are separately integrated to serve voice-switching systems with proprietary interfaces, a user on one agency's voice mail system cannot be routinely assigned a mailbox on another agency's voice mail system and retain basic functionality. It is not possible to expand the central system and expect to have

common basic features available to all mailbox users. In addition, the voice-messaging systems in place are unable to deliver state-of-the-art application solutions. Specifically, County systems do not support unified messaging functionality whereby desktop users with WAN access and e-mail would be able to communicate voice, data, fax, and video via e-mail. Until the County's voice-messaging systems design is addressed and changed, these capabilities will be generally unavailable, except on a fragmented basis.

Strengths:	✓	Basic messaging is generally available all around the County.
Weaknesses:	✓	Systems lack integration, inhibiting effective communications.
	✓	Primary voice mail server appears to be dated and has limited capacity.

B12. Data Management

Over the years the County has spent limited resources in the area of data management. This is true for two main reasons: limited resource availability and the lack of planning and analysis. Work-to-date has focused on linking systems without the benefit of determining the best way to connect databases. In short, data management has occurred in

Findings:
– The County has lacked significant data management efforts over the years.
– Lack of attention in this area reflects decentralized County culture.
– Enterprise data management is in its infancy.
– Will be key to connecting users together for information-sharing purposes.

piecemeal fashion, with products purchased and deployed, but with limited thought given to how data will be integrated or administered.

While some basic intra-agency data management has been provided for specialized systems, there has been little effort at the enterprise level to establish an overall design that will support the County. Significant data management needs on the enterprise level include connecting agencies' systems to provide required reports and to provide query capabilities. Items of particular importance include program, service, financial, and operational data to answer questions for the Council staff, Executive management, and Finance personnel, among others. Data management deserves more consideration because it is fundamental to supporting connectivity and integration, sharing of information, and increasing efficiency through elimination of redundant data handling and reporting activities. Components of data management include (1) enterprise planning, (2) data ownership and stewardship, (3) database administration, and (4) use of meta data. Each of these components is discussed further below.

a) *Enterprise Planning*

To establish proper Countywide data management, enterprise planning must occur to define data, processes, and relationships between data. With the exception of GIS, King County does not have any enterprise-level data plans, and few planning efforts are scheduled. When properly conducted, data management efforts can result in productivity increases and significant cost savings. Conversely, databases that are created without the benefit of up-front planning may interfere with the flow of business, increase costs, and, in the end, hinder the ability to delivery services. At present, and besides the area of GIS, planning is conducted only at the agency level and then typically only on a project-by-project basis.

b) *Data Ownership and Stewardship*

Aside from efforts underway with GIS, there are no Countywide data ownership and stewardship programs in place. Ownership and stewardship are distinct but related concepts. Data ownership consists of delineating responsibilities for determining what data are maintained, who can access and modify data, and enforcing rules over maintenance. Data ownership requires that every important data item has an owner. For the most part, data ownership has not been determined at the County. In contrast, stewardship is the task of properly managing data according to the rules specified by their owner. This includes ensuring that data are correctly entered, interpreted properly, and safeguarded from misuse, accidental loss, or theft. To varying degrees data stewardship also occurs within the agencies but not at the enterprise level.

When sufficiently managed, data ownership requires that data be recognized as an asset of the County and is separated from the systems that maintain the data. For example, the list of "County constituents" has a clear and established value for many purposes and is therefore a distinct asset, regardless of whether the data originate from voter registration, property tax billing, or creation of birth certificates. Data ownership occurs on a de facto basis because existing applications have natural owners in the agencies that first developed the functionality. Data that are used across agencies need to be recognized as County data, but still will require a specified responsible owner from a single agency. Ideally, the data owner will be responsible for defining how the data will be used by other agencies.

Transitioning the County to establish effective data ownership will be challenging. Agencies are not used to managing systems in this manner, especially across agency boundaries. Initial efforts have been made in the area of GIS, where the ownership model may be considered as a starting point for defining how data will be managed in the future. It is likely that agency personnel may resist sharing data until owners are assured that the data they manage will be protected and maintained as reliable.

c) *Database Administration*

Database administration occurs to some degree with all of the Oracle, SQL, Access, and other databases utilized at the County. Administration involves the maintenance that occurs related to maintaining control over the data model and related data. Database administration combines elements of ownership and stewardship. Rigorous database administration is required in especially robust environments such as those used in Oracle systems. In these environments, full-time personnel are assigned the responsibility of managing the data model and maintaining corresponding integrity.

Agencies employ database administrators (DBAs) for specific, usually large, database systems. For example, GIS has a DBA assigned to administer the Oracle and SQL server systems that are located in the center. Likewise, Finance employs three DBAs to administer Oracle-based systems. Even the larger, older systems require database administration, as is the case for Adabas systems running on the mainframe, which requires a little over one FTE to manage the data. How the different systems are administered is dependent on the various configurations and procedures established.

d) *Meta Data*

County personnel report that no formal meta data program exists. Meta data are data that define other types of information. Meta data fall into two categories: information that defines and explains data, and information about where and how to get information. This information is typically found in a DBMS system management or in program documentation. In the survey conducted for this assessment, County TMB members specified that information (where and how to find information, who owns it, what it is about) is considered to be a highly valued asset but is undermanaged. The issue of meta data has been addressed as part of GIS management but is lacking elsewhere.

Strengths: ✓ Basic information is available from the catalogs of existing DBMS systems.
✓ There is a strong demand from County staff for information about where and how to locate data.
✓ The central GIS program provides access via the Web to County GIS data.
✓ County staff are generally aware of the potential to be gained through data planning.
✓ Within agencies, system users maintain control of the data they use, providing de facto responsibility for data ownership.

Weaknesses: ✓ There is no Countywide data planning occurring outside of certain agencies, particularly GIS.
✓ There is a lack of awareness of the concept of data ownership and stewardship.
✓ No responsibility is established for maintaining the correctness or security of County-shared data, except within the individual systems.
✓ Without standards and a business-oriented data model, meta data are hard to obtain.
✓ Meta data are not being kept current.

B13. Capacity Monitoring, Backup, and Restoration

Capacity of the County's servers and other storage mechanisms (tapes, etc.) directly impacts systems efficiency, especially if there is insufficient storage and processing space to support the processing of critical applications. Similarly, the related functions of backing up and being able to reliably restore data are vital to ensure the ongoing functionality and usefulness of County systems. Each of these components —

Findings:
− Usage and storage capacity are not actively monitored for optimum use of network storage resources.
− Backup tools are sufficient for the County's needs.
− Proven technologies are in place to ensure adequate and reliable backups. However, policies and procedures are needed to ensure assignment of responsibilities.

capacity, backup, and restoration are discussed below.

With regard to managing capacity, servers appear to be key assets that are undermanaged. The County employs the use of a software tool (NetIQ) to monitor servers; however, management activities have been limited because of the prevailing attitude that it is less expensive to add disk space rather than pay for the labor to monitor systems. In general, when a server runs low on disk space, another drive is added. Quota Manager was deployed previously in ITS, but its use was aborted because of end-user concerns around inflexible limits on storage space allocated per user. At the agency level, there has been interest in using Network Attached Storage (NAS) or a Storage Area Network (SAN) for managing disk space.

From a physical facilities standpoint, many of the County's servers are located in the data center at Key Tower. The space is used efficiently, and there do not appear to be any space constraints. Space is also not likely to become a problem over the next several years, and even with more servers hosted, the total number of servers could be reduced by more efficient management over system storage capacity.

A number of software packages are actively utilized throughout the County to perform system backups. These include Tivoli, Veritas Backup Exec, TSM, Legato, and NT Backup. With the exception of the NT Backup program, these tools are generally robust and sufficient to meet County needs. The County uses Tivoli Storage for backup and restoration of LAN servers and the mainframe. Tivoli performs a combination of comprehensive and incremental backups. Administrators receive an e-mail from Tivoli if a backup has failed. The mainframe group backs up other servers and workstations by request only. Veritas Backup Exec is also used to backup the Exchange servers. Exchange server backup is typically scheduled nightly but takes over 12 hours. Tape storage for the data center is located in the Key Tower. As backups are completed, tapes are also rotated off site. ITS also backs up PCs and servers for agencies physically detached from the Key Tower. Tapes are stored off site by an external vendor, Iron Mountain.

Besides centralized system backup, agencies are also managing backup processes at their own locations. Most agencies report that backups are conducted regularly. However, there are no standard operating procedures in place to guide agency efforts. Agency processes vary in terms of the types of backups conducted, off-site storage, and test procedures related to restoration. Numerous agencies surveyed report a high incidence of backup failures. Key issues and challenges that were reported include the following:

- Backups exceeding tape capability
- Need for off-site storage
- High costs of off-site storage
- Need for adequate, enforced retention periods

Backup and retention schedules reported by each agency are noted in Table 5.

Table 5: Backup Processes

Agency	Regular Backups	Retention
Department of Assessments	X	Varies
District Court		Not reported
Council	X	24 months
Natural Resources and Parks	X	Varies: 3–6 months
Judicial Administration	X	Varies: 6 months +
OHRM/OCR	X	24 months
Prosecuting Attorney's Office	X	Not reported
Road Services	X	Varies: 3–6 months
Metro Transit	X	Varies: up to 10 years
Public Health	X	3 months
Finance		4 weeks
Fleet Administration	X	2 months
Public Defense		12 months
Adult and Juvenile Detention	X	3 months (minimum)
Superior Court	X	1 month
Airport	X	Not reported
Sheriff's Office	X	3 months
KCGIS	X	Up to 12 months

Strengths:	✓	Sophisticated backup is occurring for the mainframe and NT servers.
	✓	The County has some experience with software that helps optimize disk space (Quota Manager, etc.).
	✓	Facilities have capacity to handle reasonable expansion.
Weaknesses:	✓	Numerous agencies report a high incidence of backup failure.
	✓	Capacity management is not occurring at sufficient levels, especially related to servers.
	✓	No standards are in place for data retention.
	✓	Exchange backups are stored on site.
	✓	Restore testing is not systematized.

C. *Architecture*

Architecture is the framework and set of guidelines to direct the process of acquiring, building, modifying, and integrating IT components throughout the enterprise. The components include equipment, software, communications, methodologies, and tools. The County's architecture is considered to be the area in which most of the major strategic technology challenges reside. Strategic issues were found related to standards, processes and procedures, systems, deployment, and design. Weaknesses of particular concern include the following:

- Lack of standardized infrastructure, hardware, and applications software
- Lack of standardized Web-based technology
- Lack of uniform technical approach when integrating applications
- Heavily customized software applications that are challenging to maintain
- Continuing proliferation of servers without consideration of capacity or placement
- Lack of design, plans, and related agreements around the deployment of broadband to achieve convergence and disintegrated telephony systems
- Lack of best practices supporting enterprise data management
- Disaggregated and nonstandard workflow between agencies, as seen in Procurement, Human Resource/Payroll, Finance/Accounting, and within Law, Safety, and Justice functions
- Dual Financial and HR/Payroll systems being operated

Related to Architecture, additional discussion in this assessment is also found in Operations under Technical Security, Telecommunication, E-Mail Services, Voice Messaging, Data Management, and Capacity Monitoring.

C1. Mainframe

The IBM mainframe is physically housed at the data center on the 24th floor of Key Tower. The current architecture includes an OS 390 running at 55 MIPS with 1 GB of RAM. The system was recently upgraded and has significant capacity to grow to handle 20 to 30 percent more users and applications as requirements demand. The

Findings:
− Dated architecture, but few near-term operational implications.
− Needed to operate Public Health, ARMS systems, etc.
− Concerns about mainframe viability relate to economies of the platform.

system supports several thousand end users presently. The County's most significant legacy applications run on the mainframe, including Public Health, Financial (ARMS and MSA), and Law, Safety, and Justice applications. The mainframe supports over 80 applications, most of which were written to meet the unique needs of the County.

While dated, the mainframe still produces for the County. A bottom-line issue is that the mainframe provides a computing platform that is essential for the present applications that are written to run on it. Because the software is vital to support agencies' existing operations, so is the mainframe. And as long as needs are met cost-effectively, it is mostly irrelevant in the near term that the architecture is decades old.

Concerns about mainframe viability also relate to the economies of the platform. This issue is not technical. Agency systems are naturally migrating to run on newer types of architecture, including client-server and the Web. If agencies start migrating their applications from the platform, it will be increasingly difficult for the remaining agencies to afford to run on the platform unless new applications or uses are found.

King County hired a consultant to conduct a mainframe study in 2000. The purpose of the study was to evaluate the current mainframe environment and the functions it currently performs relative to the technology direction planned by the County. The assessment provided the following findings:

- The mainframe runs reliably, but does not offer modern features such as relational databases.
- Investment in the mainframe has been reactive rather than on a planned basis.
- There are well-established procedures for mainframe operations.
- There is a lack of integration between mainframe and distributed systems resulting in redundant data entry.
- The mainframe code was developed decades ago and relies on senior programmers who are nearing retirement.
- Reports are difficult to customize because they require a programming request.
- Delivery of reports is not timely because they are usually scheduled to run overnight. Users have become accustomed to printing non-mainframe reports at their local printer and receiving the reports immediately.
- Character-based screens are cryptically coded and difficult to learn and use.
- Applications are out of date. They follow the business rules when they were developed and have not always been changed to meet changing business needs.
- Support staffing is stretched thin across many applications without adequate documentation.

King County also operates Prime Computers. The Prime Computers are operating applications for the Transportation Department and are retaining Payroll history information for Finance. Two application examples are Base Operations Support System (BOSS) that assigns work to 2,000 bus drivers every day; and Customer Assistance Tracking System (CATS) that manages complaints and commendations. The Prime Computer manufacturer is out of business and King County contracts with a third-party vendor for hardware support. The systems are planned for migration to another platform.

Strengths:	✓ Hardware and operating systems are solid.
	✓ Mainframe has been recently upgraded with capacity to handle growth.
	✓ Mainframe runs a lot of current applications economically.
	✓ Applications on the Prime Computers are planned for migration.
Weaknesses:	✓ Architecture is dated.
	✓ Newer applications are being written for other computing environments, impacting platform utilization.
	✓ Prime Computers are obsolete.

C2. Network

The County's network is composed of numerous components including core infrastructure, transport architecture, I-NET, and cabling. The County's wide area network (WAN) comprises over eighty sites in a multiple hub and spoke topology based on a fiber backbone. Each of these components is discussed below.

Findings:
– Architecture is dated, but there are few near-term operational implications.
– The network is not completely uniform and as a result, requires additional support.
– The County WAN is not routinely monitored or maintained.
– Network support and maintenance are more complex and less efficient than would be the case if standards existed.

a) Infrastructure

The County's network is a type of hybrid composed of both Windows NT-based domains and Novell Netware 4.11 and 5.1 NDS networks. Core network electronics utilize Cisco equipment; however, other non-Cisco switches and routers are also utilized around the County. Few standards exist in the area of active electronic components (hubs, routers, switches, etc.). This is due, in part, to the broad diversity of applications in use and the timeframes over which different departments have implemented the architecture. Lack of centralized coordination of network infrastructure has resulted in duplicate circuits following the same physical and logical path. This redundancy is unnecessary and unplanned and results in increased costs for the County. The lifecycle of network equipment ranges from four to seven years, depending on the type of equipment used, level of support, and customer needs. In addition, staff have limited Cisco training, which impairs capabilities to design, install, and support the WAN. Existing WAN infrastructure is depicted in Exhibit 1.

Exhibit 1: WAN Backbone Topology

LEGEND

ATM	Asynchronous Transfer Mode
GE	Gigabit Ethernet
ATM -> GE	ATM migrating to GE
ISDN	Integrated Service Digital Network
100 Mb	100 Megabit Fiber
DS3	Digital Signal 3 - 44.746 Mb per sec.
DSL	Digital Subscriber Line
T1	1.544 Mb per sec.

There are several backup connections (for redunancy) not shown.
There are approximately 150 sites within the remote sites.
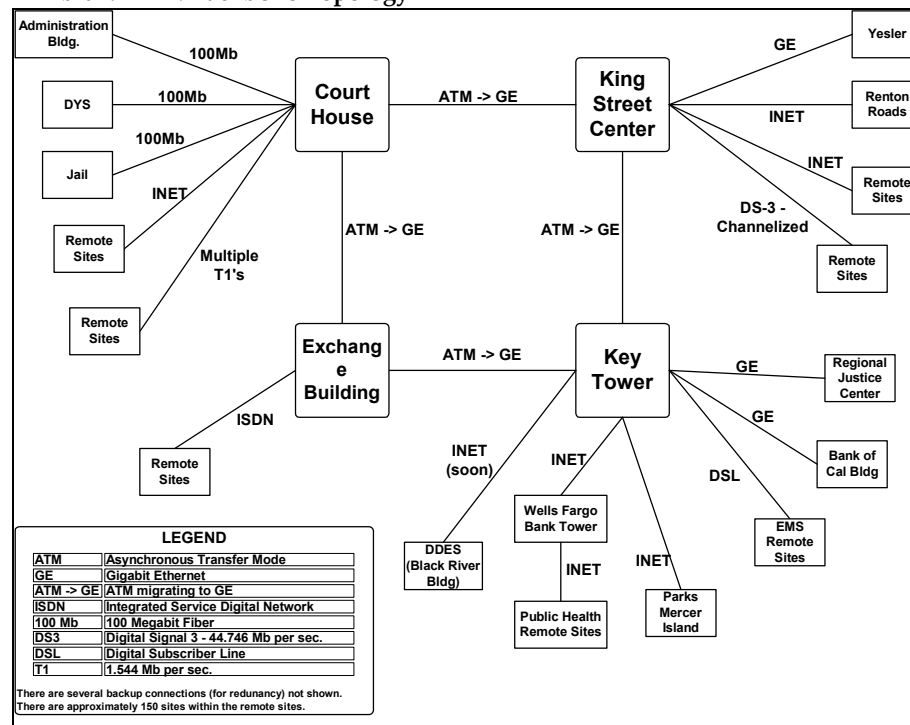
The WAN is connected via an Asynchronous Transfer Mode (ATM) backbone. The County's network accommodates multiple media types including data, voice, and video. Because of the architecture, ATM has the capability to run from 45 Mbps using a DS3 to 2.5 Gbps using an OC-48. While the I-NET network will operate as an ATM-based WAN, the County's independent WAN is slowly moving from ATM to gigabit Ethernet as needs require and budgets allow.

The network's backbone has a physical-layer redundancy in most areas, as well as dual processors and power supplies in the electronics. Redundancy exists between sites, not between agencies. A primary shortcoming of the WAN is its limited delivery area. The core emphasis is on the downtown Seattle area, and costs associated with expansion grow dramatically in proportion to the distance from downtown.

WAN performance and utilization are being monitored by an external vendor, Network Health. Real-time tools are used to diagnose problems as needed. Additional tools for monitoring and managing the WAN are used at other critical points on the network. These include HP OpenView and NetScout. Monitoring efforts appear to be largely reactive in nature. Any testing/monitoring activity is conducted on request and not on a scheduled, continuous basis. In general, ITS is responsible for managing the WAN infrastructure and cabling from the servers to the desktop. With the exception of Transit, each agency maintains the switches, routers, and CSU firmware. These are updated using a variety of methods, including CWSI2000 and Telnet.

b) *Transport Architecture*

The King County WAN transport mechanism is largely outsourced. The County's network transport is primarily conducted through leased circuits obtained from local exchange carriers. Some DSL is also deployed under a contract with Covad. In addition, the County owns a number of fiber links that are used for transport, primarily in the downtown Seattle area. The primary hub for the County's WAN is located in the Key Tower, with end nodes at the Exchange, King Street, King County Courthouse (includes administration and the jail), Yesler, DYS, and the Regional Justice Center in Kent. A need also exists to connect to the Bank of California building and the Columbia Tower. Cisco LS 1010 ATM devices currently support these points; however, a migration plan is in place to install Cisco 55/65xx equipment for higher-speed gigabit Ethernet deployment.

c) *I-NET*

The County has established ownership of I-NET from AT&T Broadband, and it was scheduled to be turned over to King County as of December 31, 2001. I-NET is a layer of three routing networks based on fiber and Marconi ATM switches. There are 70 I-NET nodes, with 288 planned on the County-owned fiber. Six primary nodes are colocated at AT&T Broadband. Marconi is contracted by the County to provide maintenance and repair on the ATM switches at the nodes. The conveyance of information between the Marconi devices is based on a series of light pulses that is

virtually tamperproof in that the fiber would have to be "opened" to intercept the light. In doing so, the circuit would drop and an alarm condition would likely result. Key benefits of I-NET will be high speed and the ability to contain or reduce communication costs for the County and other public agencies served by I-NET. The County's plan for implementing this network is under development. The plan is updated based on AT&T's progress at cabling sites. In addition, there are some initial plans for targeting I-NET for voice transmission. The Library is anticipated to be the first in this regard. Most of the fiber in place is not currently being used. This network has significant potential to bring together data, voice, and video onto one-gigabit Ethernet-based transport mechanism.

The I-NET provides an excellent foundation for establishing a consolidated County WAN. This utility can be used to support a wide variety of applications that currently use either services provided by Central Office (Telco) or leased lines from the local exchange carrier (LEC), or a competitive local exchange carrier (CLEC). The fiber-based construction of the I-NET provides a level of physical security and integrity not available in copper-based systems. Given the infant nature of I-NET operations, the County has very little infrastructure (people, know-how, operations center) in place to take advantage of this convergence opportunity in the near term. Paramount to the successful operation of I-NET is a pool of qualified staff trained with and in possession of the necessary tools to efficiently manage the resource. I-NET requires a "constant vigil" related to its performance and utilization. At a minimum, I-NET management considerations should include the following:

- Seven by twenty-four passive monitoring of traffic on all segments of the I-NET. Performance standards need to be defined and then monitored with special attention to utilization of bandwidth. This should be accomplished using standards-based software that captures critical information pertaining to usage, to be used in troubleshooting and repair. I-NET staff will eventually be required to interpret this data and make changes related to equipment and software (enhancements or replacement).
- Scheduled preventative maintenance on all key components. This may require an inventory and possible adjustment of core equipment to ensure (n+1) redundancy that supports such preventative maintenance.
- Constant attention by either dedicated County staff or a qualified outsourced vendor.
- Written service-level agreements with support organizations (AT&T) covering access to facilities where I-NET equipment is housed. This agreement must address space, power, environmental, and downtime issues with clearly delineated responsibilities and specific restoration criteria.

There have been reports of past and ongoing problems with I-NET. Managers report that past "go-live" schedules have not been met. This has created problems for GIS, which has plans to rely on I-NET for enhanced data application delivery for some County sites and outside regional agencies. In some cases, outside agencies including the cities of Bellevue, Kirkland, Redmond, Renton, Issaquah, and Mercer Island have expressed concern about the County's ability to put I-NET into operation.

d) *Cabling*

There are no agreed upon enterprisewide cable and infrastructure standards established at the County. As a result, there is a wide variety of cable installed, including category 3, 4, 5, 5e, as well as fiber and coax. Some of the more recent cable installations have been done well; however, others have not conformed to industry standards. Survey responses indicate that some poor system performance is attributed to cable, especially to "over length" segments.

Several of the interviewed IT staff appreciate the need for a set of standards governing the design, procurement, and installation of structured cable. However, current practice allows for requirements to be set on a "project-by-project" basis with no central control.

Strengths:	✓ The County maintains a robust WAN backbone.
	✓ The County WAN uses proven technology and, for the most part, leases circuits from tier-one providers who maintain a well-staffed Network Operation Centers (NOC) on a seven-day-a-week, twenty-four-hour-a-day basis.
	✓ Uptime typically exceeds 99.9 percent measured over a calendar year. Contracts with providers assure known operating costs for budget purposes.
	✓ I-NET provides a carrier-class network delivery mechanism.
	✓ The I-NET infrastructure provides network access across a wide segment of King County.
	✓ I-NET is a secure private transport medium.
Weaknesses:	✓ Delivery area for the WAN is limited.
	✓ Bandwidth on T1 circuits is fixed and not easily upgradeable.
	✓ Lack of centralized coordination of network infrastructure has resulted in unnecessary redundancy.
	✓ The County has few certified Cisco data communications staff.
	✓ There is limited network-side monitoring of I-NET transport equipment.
	✓ Few standards exist in the area of active electronics (hubs, routers, switches).
	✓ WAN monitoring is reactive.
	✓ No agreed cable standards have been established.

C3. Internet, Intranet, and Extranet

The County has been analyzing and implementing Web-based technologies for the past several years. As in many technical areas, however, it has been following — not leading — the market. The focus of development has been on providing one-way information to the public, internal users, and business partners. This low-risk approach has made a broad array of useful information available in three distinct areas

Findings:
– In general, agencies are slowly recognizing the potential of the Internet.
– Development activity is limited by the resource constraints of the individual agencies.
– The County has made initial steps to define e-government.
– Government-to-consumer applications seem to be the current emphasis of the County's e-commerce efforts.

of Web utilization: the Internet, intranet, and extranet. The Internet is being utilized to communicate with the general public. The limited intranet is focusing on information

pages and Web-enabled applications for employees. Most of the focus to date has been on providing information to the public. Just recently the County has been seeing more activity in Web development and utilization. Most of this activity is being driven by individual agencies. Particularly lacking have been advances related to conducting business and two-way transactions over the Web.

The current state of Web deployment is in the early phases of adoption at the County. Over time, County capabilities are evolving in a natural manner, increasingly becoming more sophisticated and interactive as the County progresses through the stages of Internet adoption, moving from displaying static content to supporting user queries, information submission, and two-way dynamic communication.

The County is currently using Web technology in a variety of ways. The functions reportedly being addressed now using the Web are illustrated in Table 6. In addition, KCGIS provides Web-mapping capabilities for most of the agencies noted and uses the Web itself for many of the functions listed.

Table 6: Web Utilization by Agency

		OIRM	OHRM	Adult and Juvenile Detention	Natural Resources	Judicial Administration
Current Web Functions	Research	Y	Y	Y	Y	Y
	Posting/distributing information		Y	Y	Y	Y
	Purchasing		Y	Y	Y	
	Soliciting feedback		Y	Y	Y	
	Internal information sharing	Y	Y	Y	Y	
	Telecommuting (e-mail, etc.)	Y	Y	Y	Y	Y
	Collaborative document use		Y	Y		
	Online purchasing		Y	Y	Y	
	Posting procurement data					
	Other online commerce			Y		
	E-mail	Y	Y	Y	Y	Y
		Airport	District Court	Fleet Administration	Road Services	Metro Transit
Current Web Functions	Research	Y	Y	Y	Y	Y
	Posting/distributing information		Y	Y	Y	Y
	Purchasing			Y	Y	
	Soliciting feedback		Y		Y	Y
	Internal information sharing				Y	Y
	Telecommuting (e-mail, etc.)	Y	Y	Y	Y	Y
	Collaborative document use				Y	Y
	Online purchasing			Y		Y
	Posting procurement data			Y	Y	Y
	Other online commerce				Y	Y
	E-mail	Y	Y	Y	Y	Y

Current Web Functions		Prosecutor	Public Health	Finance	DDES	DIAS
	Research	Y	Y	Y	Y	Y
	Posting/distributing information	Y	Y	Y	Y	Y
	Purchasing			Y		
	Soliciting feedback		Y	Y	Y	Y
	Internal information sharing	Y		Y		Y
	Telecommuting (e-mail, etc.)	Y	Y	Y		Y
	Collaborative document use					
	Online purchasing			Y	Y	
	Posting procurement data			Y		
	Other online commerce		Y	Y		
	E-mail	Y	Y	Y	Y	Y

Current Web Functions		Sheriff	Superior Court	KCGIS	Assessor
	Research	Y	Y		
	Posting/distributing information	Y	Y		Y
	Purchasing				
	Soliciting feedback		Y		Y
	Internal information sharing	Y	Y		Y
	Telecommuting (e-mail, etc.)	Y	Y		Y
	Collaborative document use	Y	Y		
	Online purchasing				
	Posting procurement data				
	Other online commerce		Y		
	E-mail	Y	Y		Y

The County has articulated the following vision for deploying e-government: "digital government, where residents interact with King County online, not waiting in line." While as of yet there are limited goals and objectives established to meet this vision, some agency departments are making progress on their own in development. Several departments have embarked on projects to make more information available to the public via the Internet. For example, the Department of Assessments is working to publish certain "property/account" information on the Internet for access by the general public and taxpayers. Similarly, GIS data are currently extracted and made available to an intranet GIS system (KingView) that was developed in house and is available to the public at the assessment public information office. Through this system, parcel maps and assessment and taxation information are on the County's Web site, as maintained by County GIS personnel.

In an effort to make further progress with e-government, the County has developed a three-phased approach to planning the implementation of enterprise wide e-commerce services for the public that includes an e-commerce evaluation, establishment of a pilot program, and then development of an implementation plan. The first phase is being addressed by a project to evaluate whether the County can use the State of Washington's infrastructure, tools, and policies for pilot projects. This includes exploring the potential for utilizing the electronic payments shared Web-hosting environment of the State's Department of Information Services (DIS). A simple application has been built for evaluation purposes to provide the County with some hands-on e-commerce experience in the shared hosting environment. Relevant components of the County's Internet, intranet, and extranet are discussed further below.

a) *Internet*

The County's public Internet site presents a broad array of information to the public. Most of the information posted to the County's public Internet pages is in the form of static HTML content. This constitutes roughly 80 to 90 percent of what exists on the County's Internet site currently. Approximately 8 percent of the Internet content is supported by a dynamic back-end database allowing user-directed searches. At present, the site is rather limited relative to the potential range of services that could be provided via that mechanism. The type of information/functionality currently provided on the County site includes the following:

- Static information
- News/updates/press releases
- Links to other Web resources
- Documents and forms to download or print
- Ability to send comments or suggestions directly to agencies
- Special sites for weather and other emergencies
- Ability to register for e-mail notification of specific types of events (e.g., road closures)
- Query facilities to several special-purpose databases
- A few business areas that permit online submission of information or requests
- Several GIS-based applications
- Vital records and bus passes for purchase electronically

While the public Internet site presents a vast array of information, it is limited in terms of the services that are accessible through this mechanism. The County's Internet site has also undergone usability testing to assess the value of the site. The ITS SPG Web Group conducted a study in conjunction with an external consulting firm, Usercentric Design, LLC. As part of testing, participants representing various stakeholder audiences completed 20 different tasks using one of three home page designs, and then provided feedback and recommendations regarding their preferences. Suggestions for improvements included providing clearer access to services, establishing a more robust back-end database for application support, providing better information in the services section, developing more integrated digital government applications focusing on the needs of the public and other

customers, creating more e-commerce applications, and establishing a secure authentication method.

b) *Intranet*

Significant effort has been focused on developing King County's intranet capabilities. The intranet is the set of information pages and Web-enabled (browser-based) applications that are used by County employees. The intranet is being partitioned by agencies into specific areas providing access to select information pages, applications, and data. There is substantial planning as well as actual development activity with respect to the Web-enabling applications that are used by County employees for conducting day-to-day business. In this process there has been a recognized shift away from client-server to browser-based applications. For example, projects are underway at the Sheriff's Office, DDES, Roads Services, and LS&J to expand the intranet capabilities. Overall, there appears to be more activity regarding the intranet than in the development of the County's Internet site.

Several agencies are in the planning or early stages of specification development for establishing intranet portals. The growing public demand for services and information creates a number of opportunities and alternatives worth considering. Specifically, there is potential for consolidation of intranet development efforts to prevent redundancy and unnecessary costs, and there are already commercially available solutions that may provide an alternative to developing portals in-house. Potential Web portal efforts that have been discussed to date are noted in Table 7.

Table 7: Potential Portal Functions

Agency/Department	Function
Office of Human Resources Management	Employee portal for open enrollment
Sheriff's Office	Extranet functions: • Crime bulletins • Case report data
Public Health	Clinic data sharing
Community Health	Online postings, information, and document sharing with providers

c) *Extranet*

The County extranet is a place to facilitate County business. The extranet is a set of information pages and Web-enabled application interfaces established for specific external groups for the purpose of collaboration or conducting business. This study was unable to ascertain the level of extranet activity at the County. As with the Intranet, the extranet can be partitioned to provide selected information pages, applications, and data for particular sets of users. There is a growing awareness within County agencies of the potential of providing special access to conduct business via an extranet capability.

Strengths:	✓	At present, there are County applications that have been developed in each of these three distinct areas: Internet, intranet, and extranets.
	✓	The County is building internal knowledge and skills that can be leveraged for future deployment efforts
	✓	The current Internet site presents a broad array of information content, including basic information, news, contact information, etc.
	✓	The Internet site has a consistent look and feel.
	✓	The County has an formal plan to expand use of e-commerce.
	✓	Department-level efforts are increasing, with nearly every agency utilizing Web technology and improving business processes.
	✓	ITS staff are knowledgeable and offer classes on HTML and Web standards.
Weaknesses:	✓	Current emphasis is mostly limited to static "public information" rather than interactive "public services."
	✓	Existing applications are largely the result of efforts by individual agencies, not cross-agency teams.
	✓	Mainframe data structures and system architecture do not provide an efficient way to publish "real-time" data to the Internet.
	✓	The County is behind some of its peers in implementing and realizing the benefits of e-commerce.
	✓	The County intranet is expanding in a relatively unmanaged manner.
	✓	Little work has been done on the extranet with respect to infrastructure development.
	✓	The ITS Web team has a long list of potential projects in the queue but limited resources to support development.

C4. Personal Computers

The 10,000 workstations in operation around the County range from brand new machines to dated, underperforming models. The County utilizes workstations from the most prominent vendors, including Dell, Gateway, Toshiba, Micron, and Compaq. There are also a large number of PC clones from an assortment of local vendors, including Cascade, Master Computer, and Right Systems. The workstation inventory equates to a roughly $10 million investment.

Findings:
– Total investment in systems amounts to over $10 million.
– As a result of the variety of machines in use, many personnel utilize different versions of software.
– It is estimated that approximately one-third of the current machines require replacement.

Disparity and inconsistency characterize the current status of the workstation program. The agencies that are able to fund their own technology advances tend to have more updated machines, while smaller, often general funded, agencies have dated hardware and software. There is no uniform Countywide process to replace, update, or maintain this infrastructure. As a result, approximately 3,000 machines are considered to be underperforming, which hampers the response time of these machines, presents barriers to running up-to-date software, and creates a disparity among "haves" and "have-nots."

There is no comprehensive up-to-date inventory of workstations at the County. And where agencies track these assets, there is little conformity regarding the detail tracked. Some units reliably track detailed system information, date of purchase, and operating systems, while others simply list the workstations with no associated information. There are currently no County standards for workstation hardware, or replacement and maintenance. Processor speeds and manufacturers, RAM allotments, storage capacity, and hardware configuration all vary considerably from one agency to the next.

Strengths:	✓ Some better-funded individual agencies have PC replacement programs. ✓ Two-thirds of the machines are reasonably current in terms of performance.
Weaknesses:	✓ Some equipment, much of which is located in smaller agencies, is dated. ✓ No formal enterprisewide replacement program is in place. ✓ Funding problems exist to support replacement. ✓ Workstation tracking is inconsistent. ✓ No formal standards exist.

C5. Integration

Systems across the County have been developed over many years and have focused on narrowly defined functionality intended for particular uses, mostly within specific agencies. Because applications have been developed for a specific use, the same systems have not usually been designed to integrate with others. When integration has

Findings:

– The County lacks a standard set of specific products and approaches to achieve integration.

– Present integration is achieved through the use of direct connections, middleware, and warehousing.

– There is a limited amount of intra- and interagency integration.

been established, it has been done through the use of direct connections, middleware, or data warehouses. While many specialized applications do not require integration with other business areas, the County often lacks integration in areas in which it is needed. Integration is needed at an enterprise level for applications that are used across the County, and sometimes within related business functions. Needs in the enterprise arena exist in Finance, Human Resources and Payroll, GIS, and Document Management (DM). An example of needed integration at the business-function level is in the area of Law, Safety, and Justice, where the Sheriff's Office, Prosecutor, Courts, and Jail require automated links to align workflow and thus increase efficiencies and promote better utilization of resources.

In general, there is little intra- and interagency integration between applications. For a large organization such as King County to work effectively, related agencies need to work in a cooperative manner to leverage each other's efforts and to achieve smooth workflow between them. The County processes cannot work effectively unless the computer systems that support them also interact in a coordinated manner. In the current environment, significant resources are devoted to reentering data redundantly into the County's nonintegrated systems. Then, all too often, the data require further reconciliation to ensure that data integrity is maintained and consistently reported. With the effort devoted to maintaining disparate systems, the County misses opportunities for operating more efficient systems.

Depending on the processes being addressed, different levels of integration are available for the County to use. The different levels are shown in Table 8.

Table 8: Integration Levels

Type	Description	Sample Technologies	Representative Products
1. Point-to-point file transfer	Periodic sending of entire file between two systems	FTP, e-mail, mainframe utilities, ETL tools	Operating system vendor tools
2. Hub data mart	Validated data posted to sharable hub for approved users to access	Extract-Transform-Load (ETL) tools	Ascential DataStage Informatica Software AG EntireX
3. Asynchronous messaging	Message stored until receiver calls for it	Message-Oriented Middleware (MOM)	MQ Series
4. Synchronous access	Program-to-program communication via API.	Com, CORBA, J2EE, CICS	Vitria, Tibco, CICS
5. Shared database access	Applications directly access the same data; immediate and complete	SQL queries, heterogeneous DB query middleware	Native SQL, ODBC/J.D.BC, IBI, Nimble Technologies

In responding to the technology inventory for this study, County agencies identified the handling of redundant data as a primary problem with their systems. Redundancy of data is not in itself a problem if the redundancy is managed carefully. However, many business units do not manage data as well as they should. Often changes are made in some systems but not in others, and as a result, records are added or removed in an uncontrolled manner. Under these circumstances, data quickly become unsynchronized and the users lose trust in the underlying systems. Redundancy is most inefficient from the user standpoint because staff are forced to hand-enter the same information multiple times and often in different formats.

During the planning study, it became clear that management is aware of the importance of data sharing. Numerous data integration needs were identified during the survey process. The results are shown in Table 9, identifying the data types that technical managers consider as being the most important to maintain. The data types are ranked in order of priority.

Table 9: Important Data Types Needed for Integration

Score	Data Type	Description
96	Information	Where and how to find information, who owns it, what it is
83	Account/Budget	Financial accounts and their associated balances and budgets
78	Service	A service provided by the County to its constituents and partners
77	Law/Regulation	Laws and rules related to the County
73	Project	A County project that uses people, equipment, money, etc.
70	Employee	A person who works for the County (salaried, contract, or other)
61	Legal Subject	A person of interest to County Law and Justice functions
57	Partner	Business or government agency that deals with the County
55	Facility	County buildings, roads, compounds, etc.
53	Parcel	A parcel of land in the County
52	Equipment	Devices, vehicles, computers, etc., managed by the County
37	Constituent	A person who is a recipient of County services

The survey respondents also identified a number of impediments to integration, data sharing, and efficient use of systems. The impediments, as ranked by survey respondents, are privacy concerns, lack of hardware and software, poor data quality, internal reluctance to share, lack of staff support, lack of policy, and inconsistent work rules.

The two examples of integration that currently occur within the County are for parcel data and financial (Account/Budget) data. Parcel data are shared internally and with the City of Seattle. Of the several ways to share data, the County typically uses the most basic format available, which involves point-to-point batch file transfers.

Strengths:	✓	There is recognition among agencies that data integration and sharing would be beneficial.
	✓	The County currently uses some tools that allow disparate applications to communicate with each other.
	✓	Current integration efforts include use of middleware and data warehousing.
Weaknesses:	✓	The current tendency to create point-to-point integration between systems creates a complex web of interfaces that are difficult to maintain.
	✓	Integration is significantly lacking around the County.
	✓	There is no County policy regarding how systems should be integrated.
	✓	No organization is assigned the responsibility over data management.
	✓	TMB members identified lack of hardware and software technology as a major impediment to achieving integration.

C6. Operating Systems

Operating systems provide an important software component supporting County databases and applications. Historically, operating systems have been managed both centrally and decentrally by those responsible for applications and hardware.

Findings:
− Numerous types are in place, including Unix, Linux, Windows, and other proprietary systems
− Mainly mainstream systems are in use.
− Further opportunities exist to standardize.

In this sense, acquired operating systems have had little impact on technology advancement and have been implemented mainly as a result of application software requirements. The County operates mostly mainstream operating systems including Unix, Linux, and multiple versions of Windows. Other proprietary systems are used on older types of hardware. LAN operating systems used are a mixture of NT and Novell Netware. Because of the interoperability of today's operating systems, the County has not been overly hampered by the multitude of systems in place. However, should the County move to further standardization, fewer operating systems will be required in the future. There is an opportunity to limit the number of these systems, thus providing a more manageable environment over the long term.

There is some momentum to operate on one platform for each of the major technology components in operation, including network, Web, servers, etc. For example, the County is currently in the preliminary stages of upgrading the Windows NT domains to the Windows 2000 platform. This is a prudent decision. However, this project is large and one that must be carefully planned and managed. The County's extensive server farm and the current number of Windows NT domains increase the level of risk faced by the County during this standardization process. Particular risks requiring attention include the current distributed network over a WAN (which represents potential synchronization issues), the distributed nature of staffing and technology management (with large projects being more difficult to manage in noncentralized environments), the large number of "trusted domains" that will need to be eliminated or connected to the Active directory, and the considerable degree of variance in the maintenance of the current windows NT domains. Wisely, the County has been working directly with Microsoft consultants in the early stages of the project and has received valuable support in this area.

It will be critical for the County to establish a well-defined testing system for this project and a plan that provides large blocks of time for assessment and deployment. Microsoft has published extensive documentation to guide upgrades of this type. Continuing to partner with Microsoft or another MS-certified vendor will significantly reduce the risks associated with implementation. Additionally, the County should aggressively project manage all phases of the implementation.

Strengths:	✓	Operating systems are adequately supporting the many systems in operation around the County.
	✓	Many powerful systems are being utilized including Unix, Linux, NT, etc.
Weaknesses:	✓	Many different systems are in use, requiring extra work to maintain.

C7. User Interface/Office Automation

There is an assortment of desktop operating systems running on the County's network, ranging from Windows 3.1 to Windows XP. The hardware on which these systems reside varies considerably. Despite this variability, the user environment appears to be operating adequately. The desktop tool set in use is

Findings:
− Office automation tools are functioning adequately.
− Standardized on MS Office Suite (although versions vary).
− Increased management will be required to streamline maintenance.

Microsoft Office, although versions differ. The most heavily used suite of applications includes Microsoft Word, Excel, and calendaring functions. To promote compatibility, many County installations of the productivity suite will automatically "save down" to an early version of MS Office, thereby allowing users with old systems to be able to adequately read files. Operating a consistent office suite will significantly reduce maintenance costs in the future.

Strengths:	✓ County is using industry standard Microsoft software.
	✓ Many end-users appear to have strong skills in use of such applications.
	✓ The tool sets have increased end-user productivity.
Weaknesses:	✓ Different versions are in use around the County.

C8. Servers

County servers vary considerably with regard to performance, maintenance, hardware specifications, configurations, and suitability for required tasks. The majority of the servers maintained run Novell and Microsoft operating systems.

Findings:
− A wide variety of servers are in use (both brands and types).
− Some servers are performing reasonably, while a limited number should be replaced.
− Servers are not treated as an enterprise asset.

The variety of existing servers reflects the decentralized technology environment that has developed over the years. Server operations are distributed to the degree that a number of like servers with similar uses are underutilized, thereby increasing the cost of maintenance. This is particularly evident when examining Web and file storage servers. Because servers are managed decentrally, the equipment is not treated as an enterprise asset. As a result, the County is missing an opportunity to share capacity and storage, thus being more efficient.

As with workstations, there are a number of servers that are high performing, low maintenance, and meeting service expectations with little administrator intervention. However, a number of older servers also exist that are problematic and unreliable. The variation of network operating systems running on the servers is also an issue that leads to further inefficiencies. NetWare 4.11, 5.1, Windows NT and 2000 are all found operating on the County WAN. No standards are in place to regulate server computing and manage server support.

The number of servers operating with local backup devices and software is not cost-effective. A more centralized backup capability would allow for greater control over capacity. Reduction of the number of local backup drives would also decrease the amount of backup media needed to protect agency data.

Strengths:	✓	Many servers are high performing.
	✓	Many servers are meeting the needs of the user base.
Weaknesses:	✓	There is no standardization of hardware and corresponding operating systems.
	✓	Decentralized technology environment is not making best use of assets.

C9. Databases

As with operating systems, multiple types of databases are utilized within the agencies, supporting multiple types of applications. These databases range from high-end systems such as Oracle, to small PC-based platforms such as FoxPro and Paradox. The mainframe uses Adabas and VSAM database file structures. But unlike operating systems, database selection and consistency is more critical to the County, primarily because of

Findings:
– The existing mainframe data management products reliably meet the County's near-term needs for existing applications.
– The County is moving toward standardizing on the two leading technologies, Oracle and SQL Server.
– Many types of databases are in use, ranging from high-end systems to small PC-based platforms.

the need to support improved data integration and sharing. In the past, many database decisions have been made by technicians at the agency level without thorough insight and understanding of Countywide needs. Database selection to date has been largely driven by those selecting or building systems for a specific use. Recent grassroots momentum has been building to use Oracle on the high end for larger enterprise systems, and SQL Server for departmental systems. These efforts have not been formally endorsed by County management. Many smaller multiuser systems have also been built in Access. Because there is a lot of history with some other lesser-known systems, these persist, are needed, and are scattered throughout the County. For this study, the County's databases are categorized as mainframe, relational, and nonrelational tools. Each category is discussed further below.

a) Mainframe

The County runs two mainframe data management products, Adabas, a hierarchal database from Germany's Software AG; and VSAM, which is the native file system that runs on the mainframe. Systems that use VSAM have their data definitions embedded within the program code, making them difficult to modify. In contrast, Adabas data is defined and modified by database utilities external to the program code, so systems using Adabas tend to be more flexible and easier to maintain. Although reliable, mainframe tools are not as flexible or as functional as the modern relational products in use. For illustrative purposes Table 10 identifies several of the systems running on each of the mainframe products.

Table 10: Mainframe Database Applications

Adabas	VSAM
• Accounts Receivable • Accounts Payable • Real Property Tax Roll • Personal Property Tax Roll • Pet Licensing • Voter Registration and Elections	• Fixed Assets • ARMS Financial Management • MSA Payroll package • Purchasing package • PROMIS (Prosecuting Attorney's Office) • SEA-KING • SIP Subject in Process — Adult Detention • Roads — Traffic Engineering

All mainframe applications are maintained by County staff. Because of the age of the technology, support staff possess skills that are becoming increasingly difficult to find in the marketplace. However, as necessary, staff may still be trained to support the applications.

b) Relational

Besides mainframe data management products, the County also runs the two leading relational databases, Oracle and Microsoft SQL Server. Oracle is used for a variety of systems, including both enterprisewide and departmental applications. SQL Server is mostly used for departmental systems. Both of these products enjoy a solid market share and may be relied on with little risk. Although the County would likely achieve some increased efficiency if only one of these products were in use, the size of the County and the differing requirements for its applications support use of both systems tailored to the requirements of the specific situation. Presently, Oracle is used as the data store for the large-scale ARC-Info GIS system, and for PeopleSoft and Oracle financial applications. Oracle is available to run on almost all operating systems (including the mainframe) and is known to be superior in capacity and performance. The product also runs on UNIX, which is used as a primary client server platform at the County. SQL Server does not have a reputation for being as robust as Oracle, but the latest releases have improved sufficiently to be suitable for many enterprise applications.

Additional database technologies are used in specific situations. For example, Ingress (a RDBMS from Computer Associates) is currently used for a few departmental applications. Another relational product, Informix, is used at the Department of Development and Environmental Services (DDES) for the Accela integrated suite of permitting applications. A number of agencies use other LAN-based tools for some work group systems, including MS Access, Clipper, and FoxPro. There is also widespread and increasing use of Microsoft Access for work group systems.

Each DBMS tool has its advantages and disadvantages. The differences make the tools suitable under different circumstances. Table 11 illustrates the main differences between the leading relational DBMS products. DB2 is the only one not in use at the County. It is included to provide a comparison for mainframe-based technology.

Table 11: Comparison of Relational Database Tools

Feature	Oracle	SQL Server	DB2	MS Access
Enterprise scale	Yes	Yes	Yes	No
Relational standards	Good	Good	Good	Moderate
Competitive cost	High	Moderate	High	Very low
Ease of use	Advanced	Moderate	Advanced	Easy
Market share	Strong	Strong	Adequate	Strong
Runs on mainframe	Marginally	No	Yes	No
Runs on Microsoft NT	Yes	Yes	Yes	Yes
Runs on UNIX	Yes	No	Yes	No
Ongoing maintenance costs	High	Moderate	Moderate/High	Low

c) *Nonrelational*

Nonrelational databases play a key role in the County's infrastructure. While it is considered best practice to standardize on relational architectures, there are situations in which more specialized processing is needed and the cost of using a relational tool may be prohibitive in terms of redevelopment. One example of a nonrelational database involves spatial databases, which are designed specifically for maintaining and rapidly processing geographic data. A second example involves HTML (documents), which is used in Web pages and Web-based business transactions. In some cases the relational vendors provide extensions to their products for these needs (such as Oracle's and DB2's Spatial Database features), and in others the database is designed in a nonrelational format. Use of nonrelational databases has a long history at the County, especially considering that older legacy systems were developed prior to relational technology's becoming mainstream.

Strengths:	✓ Mainframe database products are reliable and provide excellent performance.
	✓ There is little business risk associated with using VSAM or Adabas.
	✓ The relational databases in use have become de facto standards supporting business applications.
	✓ The two enterprise products in use at King County are the market leaders and can be relied upon for future use with little risk.
Weaknesses:	✓ VSAM does not have the advanced features of a database management system.
	✓ Neither VSAM or Adabas are relational model products.
	✓ Oracle is a more complex environment in contrast to SQL Server, and requires more support from highly trained technicians.

C10. Data Warehousing

Data warehousing is one of several data integration mechanisms in use at the County. Warehouses are specialized databases that use data extracted from other operational systems for reporting purposes. Data warehouses are different from operational databases in several different ways, as identified in Table 12 below.

Findings:
− Widespread use of warehouses has not yet occurred; however, agencies are looking to warehousing increasingly for solutions to their data management needs.
− Data warehouses provide the potential to combine data from disparate sources together into a single reporting capability.
− Data warehousing is one of several data integration mechanisms in use.

Table 12: Data Warehouses versus Operational Data Stores

Characteristic	Data Warehouse	Operational Data Store
Scope	Wide — allowing reporting on many related topics	Narrow — efficiently support specific processes
Retrieval	Masses of data provided for comparisons and analysis	Transactions-based using consistent repeating patterns
Timing	Point-in-time "snapshot" needed for a consistent view	Continuous state of change linked to daily workflows

Technically, data warehouses exist because designers have found that it is not always practical to have a single database design that serves both operating and reporting purposes. Data warehouses are designed specifically for indexing, redundancy, and design patterns that allow for easy and efficient reporting.[1] Although the County's current relational servers (Oracle and SQL server) are well able to support data warehouse processing, in some cases some specialized data warehouse products are also being used. Reporting from data warehouses normally requires specialized On-Line Analytical Processing (OLAP) software that can efficiently provide needed data aggregation and manipulation functions. The County currently operates two such products, including Crystal Reports and Business Objects.

Several County agencies have developed data warehouses for their own use. For example, the Finance Department has developed a Web-reporting database, depicted in Exhibit 2 below, that is available to users who are connected to the County's intranet. The reporting environment submits queries to the Oracle system and to the SQL server extract from the ARMS system. Information is extracted from each of the source systems. Similarly, the GIS group has developed a warehouse that combines data from several systems into a location-keyed Oracle tabular database. Additionally, several other agencies have created data warehouses to support their reporting needs.

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[1] The term "data warehouse" has come to be associated with large enterprisewide reporting initiatives. Smaller, department-specific reporting databases are known as "data marts." In this report, the term "data warehouse" is used to refer to any database designed specifically for reporting and/or data exchange.

Exhibit 2: Financial Reporting Warehousing System
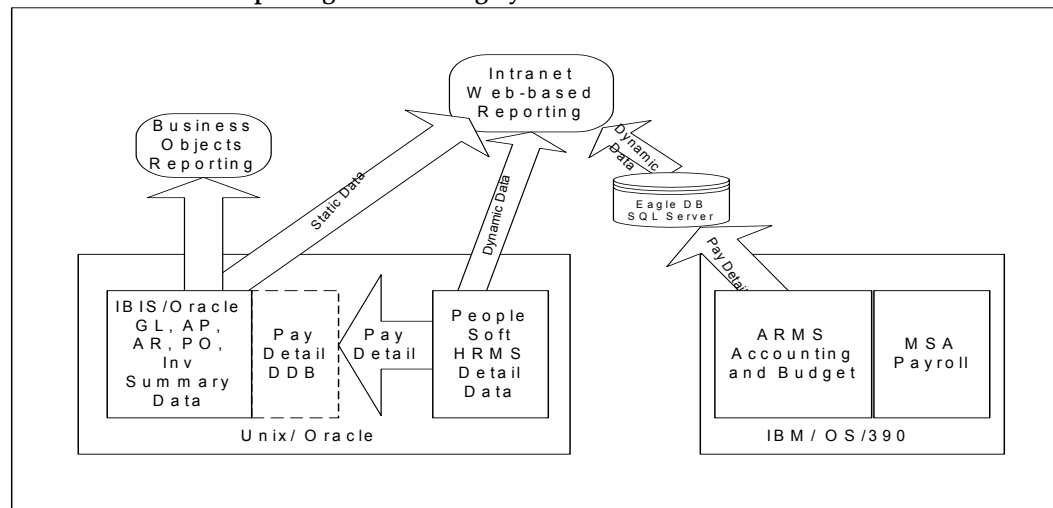
Strengths:	✓	Current relational databases, including Oracle and SQL server, can be used for data warehousing purposes.
	✓	Financial reporting is being enhanced through warehouses already in place.
	✓	Agencies are beginning to make active use of data warehousing as an integration tool.
Weaknesses:	✓	No comprehensive approach exists at the County related to data warehousing.
	✓	Some important data is not yet available through data warehouses.
	✓	The County does not own the needed extract-transform-and-load (ETL) software needed to efficiently maintain data warehouses.
	✓	There is a lack of data-modeling skills in the County that are needed to design warehouses.
	✓	No operational model in place.

C11. Telephone and Voice Mail

The County's network of NEC, Fujitsu, Nortel PBXs, and key systems are connected to the Public Switched Telephone Network (PSTN) via leased services from local exchange carriers (Qwest and Verizon). All County-owned equipment runs on County owned/leased property with the exception of colocated I-NET nodes. As stated earlier in the

Findings:
– The telephony network at King County is fragmented and served by different providers.
– Voice-switching systems are disaggregated, and various systems are in use to support voice mail.
– The County requires additional assessment, analysis, design tasks, and cost/benefit studies before a plan may be implemented to deploy VoIP.

assessment, with few exceptions, the voice-switching systems are disaggregated end points that allow inter-County office communications via the local exchange carrier switch only. The voice switches are not privately networked and are based upon three proprietary types of PBXs and multiple, limited function key systems with autonomous interconnected voice mail systems. Several of the PBXs appear to be approaching the end of the equipment lifespan. Further, none of PBXs have multiplexed streaming data request software or call detail recording enabled for enhanced functionality.

Currently, connectivity to the PSTN is accomplished several different ways and under varied cost models. In some cases, PBXs are networked to a hub and the hub carries the PSTN traffic on more efficient, consolidated trunking. In other locations, each PBX or key system is connected directly to the PSTN with individual trunking. Other individual desktops are served directly from Qwest via Centrex single lines. Some of the County's call centers (centralized answering points) are served from the Qwest Central Office–based Centrex services, and some are served by the Nortel or NEC PBXs.

Exhibit 3 depicts the existing switching system environment. The existing system prohibits deployment of practical call detail recording, standardization of unified messaging, voice over IP (VoIP), or implementation of other advanced applications. It should be noted that ITS has initiated a procurement process to obtain external assistance in initiating a Telephony Stabilization Project to help identify ways to improve current operations.

Exhibit 3: Existing Telephony Environment

For voice mail, there are various systems in use. All Centrex and NEC end-users utilize a County-owned voice mail service delivered via a Pulsepoint (formerly Digital Sound) VS2110 system. The system is integrated to the Centrex common block via an SMDI interface while simultaneously being integrated to a host NEC PBX. There are 7,200 users on the system, which apparently will no longer be supported by the manufacturer after

2004. Other County voice mail users are served by various stand-alone voice mail systems installed on Meridian PBXs and NorStar key systems.

The County has conducted one brief trial related to implementation of VoIP. The trial resulted in a determination that the County is not yet ready to deploy the technology. During this study no specific trial data were available to validate the cost/performance advantages of the technology. The technology delivering VoIP must involve strict criteria for the many required network elements. For the future, the bandwidth provided by I-NET will enable a pure IP transport with carrier-grade quality. The active electronics between the desktop telephone set and the serving voice switch, or PSTN, will ultimately determine the quality of the service. Many of the County's voice-switching systems support upgrades to enable VoIP connectivity between switches, and between switches and IP telephone sets. Many providers of soft switches and IP telephone-switching systems also offer autonomous systems that can deliver voice over the County's WAN. In those areas where central office services (Centrex) are used for voice and leased lines for data, a consolidated VoIP solution could yield substantial savings in the future. Future testing of the technology will allow the County a means to determine the size of the opportunity.

Strengths:	✓ The majority of County-owned PBX voice-switching systems, though proprietary, are manufactured by tier-one manufacturers, and many are potentially upgradeable.
	✓ Voice services provided via VoIP technology can be implemented on a small scale almost immediately.
	✓ Technologies implemented as part of the I-NET project have the potential to provide a suitable transport mechanism for VoIP between Ethernet switches.
	✓ The single-mode fiber and assumed-loss budgets in AT&T's construction of the I-NET guarantee quality of service equal or extremely close to toll quality.
	✓ In those areas where central office services (Centrex) supports staff for voice and leased lines for data, a consolidated VoIP solution could yield substantial savings to the County.
	✓ Many of the County's voice-switching systems support upgrades to enable VoIP connectivity between switches, and between switches and IP telephone sets.
	✓ Many providers of soft switches and IP telephone-switching systems offer autonomous systems that can deliver voice over the County's WAN.

Weaknesses:	✓	King County's voice-switching systems have evolved into a disaggregated collection of disparate and distributed systems.
	✓	The distributed telephony network consists of three proprietary PBXs and multiple limited-function key systems with autonomous interconnected voice mail systems.
	✓	Several of the PBXs are at the end of their life cycle.
	✓	None of the PBXs have SMDR software or call detail recording functionality enabled.
	✓	The centralized voice mail system appears at capacity without an option for hardware expansion or software upgrade. The current voice mail system is 14 years old and has been determined to be "nonserviceable" by its vendor. It is tentatively scheduled for replacement.
	✓	If VoIP is used to replace existing, first-generation PBX equipment, financial benefits may not be available in the short term.
	✓	ATM is a solid transport vehicle for voice when such transport is at a DSx basis (i.e., T1 or DS3); however, it is not the correct vehicle for VoIP and not the preferred transport for IP.

C12. Wireless

Wireless is a transport mechanism that literally "replaces" the physical connection to the network. Wireless conceptually could be employed in many agencies. However, agencies are mostly unaware of the current limitations in speed, bandwidth, and coverage that will dramatically affect overall transport

Findings:
– Wireless use is in its infancy within the County.
– May provide cost-effective solutions in particular circumstances, but little analysis has been conducted to date.

performance. Wireless local area network connectivity ideally supports mobile operation of intelligent devices. A potential use at the County is in the Sheriff's Office, where officers could connect their laptops into the network. Potential connectivity would provide seamless access across the enterprise for computers equipped with wireless network interface cards.

The County currently has very limited wireless technology in place. Efforts to date have included utilizing Cellular Data Packet Data (CDPD) and Ricochet modems. Ricochet modems were used prior to the company's demise. The roughly 210 units that were in use have not been replaced. CDPD application has not moved beyond the discussion stage because overall standards for use of wireless are not well defined. Overall, wireless applications have been recognized as potential opportunities at the County for cases in which one of the following situations or requirements is present:

- Need for rapid deployment of a "temporary" LAN (e.g., a LAN set up at a public facility for online voter registration
- Historic buildings that cannot be modified
- Open office or work environment(s) with low-density work force
- Application-specific requirements with "mobile" staff using laptops and/or PDA devices

Very little planning has occurred regarding wireless technologies. It is apparent that further cost/benefit analysis would be useful to the County, particularly directed at those personnel who work in the field.

Strengths:	✓	Limited investment of time/resources has occurred to date.
	✓	Technology offers potential cost-effective solutions, particularly for staff out in the field.
Weaknesses:	✓	There is no defined plan for deployment of wireless, and no recognition of Cellular Data Packet Data (CDPD) as a viable network transport medium.
	✓	There is no standard for mobile devices, including personal digital assistants (PDAs).

C13. Applications

Applications are the software systems being utilized by end-users throughout the County. Some applications cross agency boundaries and can be categorized as enterprisewide, while others are utilized only within agency boundaries. Enterprisewide systems addressed in this assessment include Financial systems (ARMS, IBIS), and Human Resources/Payroll systems (PeopleSoft, MSA). GIS and Document Management systems are also in use and discussed. Agency-specific applications include the numerous client/server and mainframe functions utilized by LS&J agencies, Public Health, Transportation, Natural Resources, and the Department of Assessments.

a)   Enterprisewide

Enterprise applications are those that are utilized across the County. Two primary business systems are recognized as providing enterprise functionality: Human Resources/Payroll and Financial. Currently, two separate computing platforms are being utilized for Human Resources/Payroll, and two others support the Financial function. These four systems are listed in Table 13 and are further discussed below.

Findings:
– Using multiple separate enterprise systems reduces efficiency and significantly increases support requirements.
– Current systems require reconciliation to produce Countywide reports.
– Moving to one of the two current systems is not possible without significant effort and workflow reconfiguration.

Table 13: Finance and HR/Payroll Systems

System	Function	Database Environment	Development Language	Source
MSA	HR/Payroll	VSAM/Adabas	COBOL	Third-party package, custom developed
PeopleSoft	HR/Payroll	Oracle	Proprietary programming language	Third-party package
ARMS	Finance	VSAM	COBOL	Third-party package, custom developed
IBIS	Finance	Oracle	Oracle tools	Third-party package

(i) Finance

The County is operating two separate financial systems: the Oracle "IBIS" system and a modified packaged mainframe system called "ARMS." Both systems serve a number of agencies. The Oracle system originated through the Metro Transit merger. This system uses recent technology employing Oracle Corporation's public-sector applications running over the Oracle database. The functionality available within this system is robust and is generally current with state-of-the-art governmental applications available in the marketplace. The specific version, however, is several years old. The ARMS system is the older of the two, is customized, and has been modified within the County over the past 20 years. ARMS runs over the mainframe on VSAM files. The software is not meeting all of the County's current end-user needs, is cumbersome, and lacks a user-friendly interface.

(ii) Human Resources/Payroll

The County also operates two separate Human Resources/Payroll systems: PeopleSoft and MSA. Like the Financial systems, one uses current technology (PeopleSoft), and the other is an older mainframe-based system. This dual-system configuration is similar, in terms of business issues, to that of the Financial systems situation. PeopleSoft was installed in 1999. The mainframe-based MSA system is dated and has a narrow set of HR/Payroll functionality.

PeopleSoft was originally installed for those employees who were tracked in the ISI system. The County now operates version 7.01, which is not the most current release. Modules being utilized include human resources (including applicant tracking), payroll, benefits administration, and time and labor. The modules support roughly one-third of the County's employees and interface with the IBIS system. System expansion cannot occur to the remaining agencies' employees without significant reconfiguration of the software. This limitation is due to the particular functionality needed to process information for the many remaining bargaining units not currently running on the system. The one PeopleSoft application utilized across the County is the applicant-tracking module.

In contrast, MSA is a mainframe application that has been in operation since 1976. The software was originally developed by Management Science America; it has since changed hands several times and is now supported by GEAC. The County is not operating the latest version of the software, but the current system is reported to be stable. The system was last upgraded in 1999, and another upgrade is planned for spring 2002. The system is configured to support approximately two-thirds of the County's employees, and interfaces with the ARMS system.

County personnel fully recognize the potential benefits of migrating to one integrated system. Key problems repeatedly noted with the running of dual systems include the following:

- The difficulty involved moving employees from one system to another when personnel transfer departments. This limitation has resulted in employees being processed on two different systems even though they may work for the same department.
- The requirement for operating two systems at the same time (because PeopleSoft is required for applicant tracking across the County).

The primary barrier to using only one of the two systems is the tie to different payroll cycles in use at the County. The MSA system is configured to pay on the semimonthly cycle, while PeopleSoft is configured to pay on a biweekly cycle. Neither package may be reconfigured easily to support the whole County.

As a result of the dual-system environment, other subsidiary systems have also been developed to supplement Human Resources/Payroll functionality. These systems include established databases for tracking temporary employees, applicant claims processing, and diversity reporting. Use of these stand-alone systems has resulted in the introduction of errors and required reconciliations with the relevant primary human resource and applicant tracking systems. Further, human resource functions conducted outside of the automated systems (such as position control) are not integrated with either primary system and require extra synchronization.

Strengths:	✓ Each system allows user agencies to maintain unique characteristics (i.e., number of hours in a standard work week). ✓ Systems have been running reliably — PeopleSoft for 2.5 years, MSA for 26 years.
Weaknesses:	✓ Significant time is spent reconciling data between HR/Payroll and Financial systems. ✓ Numerous additional stand-alone databases have been developed for tracking data that are not maintained in the separate systems. ✓ Departments report information differently depending on what systems are used. ✓ OHRM lacks ownership of the human resource data and has limited confidence in its ability to produce accurate reports. ✓ Neither HR/Payroll system supports the desired payment cycle without significant reconfiguration. ✓ The MSA organizational structure is not in synch with the ARMS numbering scheme, and reports can only be generated following an offline analysis of the information. ✓ Workarounds to overcome shortcomings in MSA have created inconsistent and inaccurate data. ✓ Documentation for modifications to the systems is lacking. ✓ Only a limited number of people have access to the MSA system, and very few of those have the authority to operate the system.

b) *GIS*

GIS is a key technology supporting many core business functions at the County, including Public Health, Elections, Permitting, Transportation, Utilities, Assessment, and Taxation. The current level of integration between GIS and non-GIS legacy systems is weak. In support of these functions, the County runs Environmental Systems Research Institute (ESRI) software. ArcINFO software is used to maintain GIS data and also for advanced analyses. The desktop

Findings:
− GIS is an important application supporting numerous agencies' business functions.
− Integration of past legacy GIS databases is poor and has led to many inefficiencies.
− The County has significant personnel resources available supporting GIS.
− GIS standards will be critical for the County to realize its goal of becoming a regional GIS provider.
− A well-designed GIS data warehouse is central to providing a multi-agency system.

software package, ArcView, is also used at numerous locations for data display and analysis. GIS data is routinely linked with tabular databases such as Oracle and Microsoft Access.

Full utilization of GIS architecture depends heavily on the various agencies' efforts to work together. The GIS organization is distributed between different departments within the County. In the past this created problems in achieving effective coordination and cross-department collaboration. Recently, however, steps have been taken by the County Executive to clarify overall responsibility for all County activity by moving the GIS Center from ITS to DNRP, and giving the DNRP Director overall responsibility for all aspects of enterprise GIS. In this process it was also decided to combine the 11 GIS staff working in Wastewater Treatment, Water & Land Resources, and Parks divisions into a single DNRP GIS Unit, colocated and managed at one site.

To ensure improved technical collaboration and strengthened management oversight of GIS activity, two new committees have been established. The relationships of DNRP, the GIS Center in DNRP, and GIS Units located in other County agencies are illustrated in Exhibit 4, which provides an extract from the County's existing, comprehensive diagram depicting the consolidated GIS organization:

Exhibit 4: GIS Consolidated Organization Overview

The organizational changes described above were prompted to address a number of inherent inefficiencies in the previous organization and to position the County as a GIS service provider to member cities and districts. The vision involves the delivery of this service via Web-based systems on the Internet or via I-NET.

Strengths:	✓ Technology systems utilize advanced industry standard software (ESRI).
	✓ The reorganization of the GIS entities promises to support increased system use.
	✓ The relocation of the function to DNRP will provide a more reliable funding mechanism for GIS. The primary focus will be to maintain the GIS Spatial Data Warehouse, and provide access to the rest of the County.
	✓ Key GIS leaders in each of the linked departments are seasoned experts with in-depth knowledge to support practical utilization of systems.
Weaknesses:	✓ There is no strategic framework in place for directing and unifying GIS efforts.
	✓ Data standards are agency specific and used inconsistently.
	✓ Data ownership concerns associated with varying agencies' utilization have not been fully addressed.
	✓ The core data set for the County is "Parcels Coverage," which is a key data set designed around a cumbersome data structure; it has become outdated and caused synchronization problems.
	✓ Many key GIS datasets are not integrated.
	✓ Some GIS groups have resisted centralization efforts.

c) *Document Management*

Document management involves the processes and systems in place to store, track, and retrieve records-based information. Many agencies manage documents through the use of the network and word processing. No enterprisewide capabilities have been

Findings:
– No enterprise standard systems are in use.
– Most agencies use word-processing applications to store and retrieve documents.
– Department of Judicial Administration uses a specialized form of document management.

implemented, nor is there a plan to do so. Some document management systems are set up decentrally within the agencies. For example, the Department of Judicial Administration utilizes two applications including Electronic Court Records and CRIMS. Both of these applications have been developed by external vendors. The Electronic Court records system has been in place since 1999, while CRIMS was installed in 1997. Additionally, the County Records Department operates a record center that stores over 100,000 cubic feet of inactive records disbursed in four separate locations. Records are tracked via an Access database. The Records Department system was designed by an external vendor.

Strengths:	✓ Some document management is available to track document storage and retrieval functions.
	✓ The systems in place have been tailored to meet the unique needs of the County, as in the case of Judicial Administration.
Weaknesses:	✓ There is no enterprise document management system available for agencies to use.
	✓ Most document management processes are time-consuming and inefficient except in the instances in which document management tools are used.
	✓ Document management systems are not well understood by the personnel responsible for the functions.

d) *Agency/Specialized*

There are many legacy software systems operating within agency environments including LS&J, Public Health, DOT, DNRP, and the Department of Assessments. Legacy systems represent investments in technology that are aging and sometimes difficult to maintain because of lack of vendor support, diminishing expertise, inflexibility, and a lack of compatibility with state-of-the-art architecture. Generally, existing systems

Findings:
– For the most part operating viably, however, some systems require a fair amount of maintenance.
– Unique set of applications that are heavily customized.
– Disparate set(s) of modules.
– Mainframe technology can continue to sustain LS&J systems for the near term.
– Much of the current software has exceeded its original design life.

are operating viably. In some cases these systems operate at high performance levels (e.g., as in the case of Public Health). Other systems are operating in more fragile states, such as in the case of Roads' systems. The County's major specialized systems are described below.

(i) Law, Safety, and Justice

Law, Safety, and Justice (LS&J) agencies are supported by a number of disparate systems that have evolved to address different, but related, business needs for the Sheriff, Prosecutor, Courts, and the Jail. Current systems are operating viably but are inefficient and a challenge to maintain. The systems use mostly customized software, run over the mainframe, and are not integrated. This situation has resulted in two primary issues. First, storage, tracking, and retrieval are accomplished inefficiently. Second, data flows through the various business units redundantly, requiring the handling of the same data repeatedly, often with manual reentry required. The most pressing need within LS&J is to share records-based information about people, which is needed by all business units and passed on from agency to agency in daily workflows. Overall, LS&J agencies report that their own business rules have been defined as substantially unique, and consequently, past system efforts have focused on developing custom systems instead of installing packaged software and linking systems.

To foster improvements in this area, the State of Washington has become involved by developing standard data definitions. Use of standard definitions is intended to help unify the design and management of new LS&J systems. As it is now, fragmented systems design has diverted attention from standardizing workflow. State data definitions will help establish standards for data interchange and reduce the risk of building disintegrated systems. Ultimately, standardization is needed to promote compatibility among LS&J systems in the criminal justice arena, both within the County and with external business partners.

The core components of LS&J's systems revolve around numerous primary software applications and several special-purpose applications required in support of case management. It is worth noting that several of these key systems are developed and maintained at state and federal levels, and are integral to the County's overall architecture. Core LS&J software applications and the information available about them are listed in Table 14.

Table 14: Primary LS&J Applications

Application Name	Acronym	Platform	Function
Incident Report and Investigation System	IRIS	NT Server	Core case investigation and management system for Sheriff
Computer-Aided Dispatch System	CAD	DEC VAX	Sheriff dispatch within 911 call center
Automated Fingerprint Identification System	AFIS	NEC	Fingerprint system
AFIS Index	ANI	MF IBM 2003	Indexing system for AFIS
Livescan		Unix Server	Electronic entry into AFIS
Prosecutor Management Information System	PROMIS	MF IBM 2003	Core case-management system for Prosecutor
Subject in Process	SIP	MF IBM 2003	Core jail system
Sea-King		MF IBM 2003	Indexing and locator system for DADJ
Classification	CLS	MF IBM 2003	Inmate classification
Jail Billing	CKS	MF IBM 2003	Billing of jail costs to municipals
Crimes Capture System	CRIMES	NT Server	Electronic mugshot system
Jail Master Movement	JAMMA	NT Server	Single-source scheduling for inmates for various activities
ComCor	ComCor	NT Server	Work-release management system
Court Management Information System	CMIS	Unix Server	Core case-management system for Superior Court criminal cases
Juvenile Justice Wide Area Network	JJWAN	NT Server	Core case-management system for Superior Court juvenile cases
Electronic Court Records	ECR	Filenet Server	Document imaging and management system
Superior Court Management Information System	SCOMIS	External System	Official system of record for all Superior Court cases in State
Juvenile Court Information System	JUVIS	External System	Official system of record for all Juvenile Court cases in State
District Court Info System & Judicial Acct Sub-System	DISCIS	External System	Official system of record for all District Court cases in State
Washington Statistical Information System	WASIS	External System	Information not available during study process
Washington Crime Information Center	WACIC	External System	Information not available during study process
National Crime Information Center	NCIC	External System	Information not available during study process
National Crime Information Center III	NCICIII	External System	Information not available during study process

These applications interface in a number of ways, as depicted in Exhibit 5 below. The schematic was developed as part of a Law, Safety, and Justice integration study that was conducted during fall 2001.

Exhibit 5: LS&J Architecture
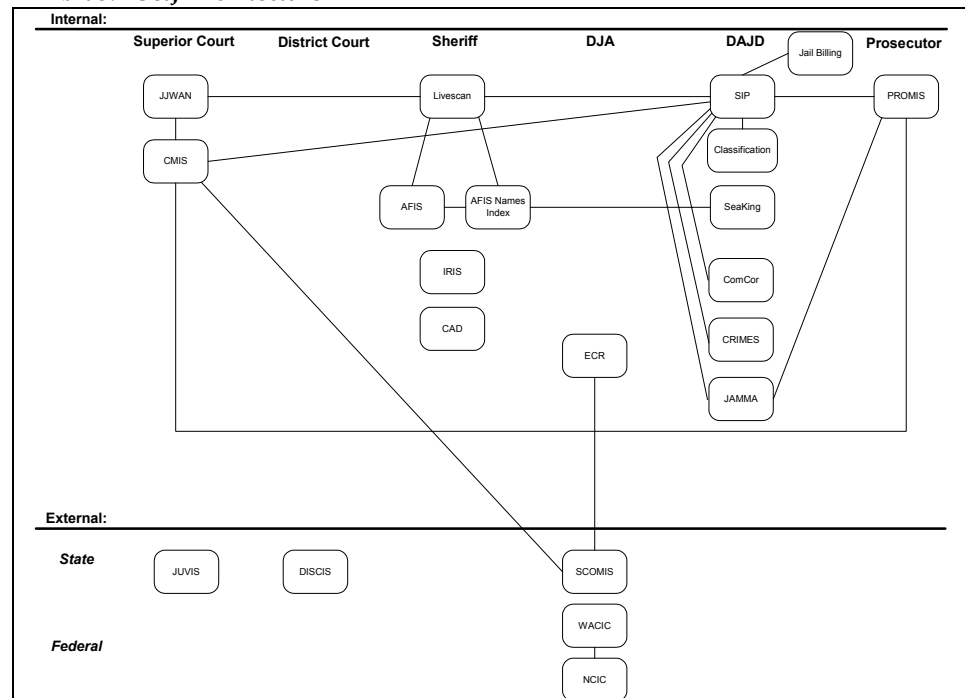
Every LS&J system currently has established initiatives to replace existing applications. The bases for moving forward with such initiatives are inflexibility, aging technology, high maintenance, and a lack of functionality.

(ii) Public Health

The operations for Public Health are widely disbursed to over 40 service delivery units. Systems support over 1,800 users and are serviced by 26 IT staff. The only system used centrally is a grants management application. The Department's operational systems are unique to the health care services delivery function, and many of these systems are required by external regulatory bodies.

Public Health systems have been designed around several key databases. Unique applications have been developed to run over SQL server, Access, Clipper, and Delphi databases. Web and client-server applications are also operated for data-tracking purposes. Despite being well designed and operating adequately, many of these systems are continuing to age in terms of functionality.

The Department relies on internal technology staff who have the specialized expertise to support the unique systems. Health Department staff support the applications with both primary and secondary support for each of the various systems in place. Key systems within Public Health are noted in Table 15.

Table 15: Public Health Systems

Application	Function	Technology
Signature	Medical billing	Mainframe (ASP), SQL Server, and Access
SKRTS	Patient encounter tracking and billing	Clipper and Delphi
SKIIS	Supports statewide immunization tracking	Web application
Envision	Environmental permit tracking	Client-server, Sybase
TIMS	TB tracking	Client-server, Sybase
MLAB	Lab results system	Client-server, Cache/e-based
VISTA	Statistical data store	
Pharmacy FS1	Prescriptions and tracking of pharmaceutical inventories	Client-server
Medical Examiner	Tracks records for the Medical Examiner	MS Access
Birth Records	Tracks birth records	State provided
STD Tracking	STD database	MS Access
Death Records	Database of death certificates	MS Access

These core applications are depicted in Exhibit 6.

Exhibit 6: Public Health Applications Architecture
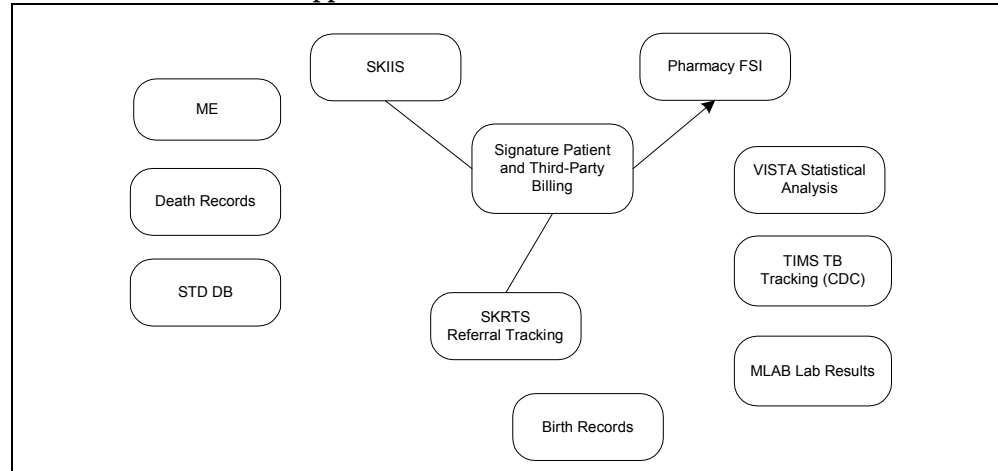
(iii) Department of Transportation (DOT)

The DOT includes transit, roads services, and fleet administration functions. Applications reported by Transit and Roads are discussed below. Information from Fleet Management was not provided as part of the study process.

- *Transit*

    Existing legacy systems operating in Transit are unique to the public transportation business. Most applications are operations based and rely on databases to support the tracking of business information, as in the case of the bus stop inventory. A number of these systems are aging and do not meet all requirements needed by the agency.

    A plan is in place to replace many of the systems with currently available vendor products. The centerpiece of the plan is to conduct a three-phase program over three to five years for life cycle replacement of obsolete vehicle-information systems. Systems being replaced on vehicles include the driver display, the on-board computer, and the radio/AVL system. The Transit plan includes integrating the automatic passenger-counting system, providing automated stop announcements and destination signs, automated vehicle monitoring, and improved transit-signal priority information. A regional smart card fare-payment system is currently under construction.

    Projects will replace customer assistance, bus operator, dispatch, work assignment, timekeeping, and bus stop functions. In addition, significant upgrades and enhancements are planned for the "distribution database" (DDB), which collects and manages information in a central format. This DDB is central to transit reporting and is connected to many of the operational applications. A divisionwide data model was created as the basis for the original DDB and is being updated as other systems are updated and replaced. Transit maintains Oracle expertise in-house to support DDB. The primary applications in use are listed in Table 16.

Table 16: Metro Transit Systems

System	Function	Technology
HASTUS	Scheduling/run cutting	NT, Oracle, C++
ZRS	Bus stop sequencing	Windows, Focus
Zones	Bus stop inventory	Windows, Focus
TOPS	Transit Operator Payroll	Mainframe, COBOL
Boss	Bus operator dispatch, timekeeping, work assignment	Prime, QUEO
OSS (Operations Support System)	Replaces BOSS	Unix, Windows, Delphi, Oracle
CATS	Customer Assistance and Comment Tracking System (to be replaced)	Prime, QUEO
Bus Time	Timetable and bus stop data	NT, Oracle, C++
ATIS (ATP)	Automated trip planning	Linux, C, Visual Basic for client server

System	Function	Technology
AVL	Automated vehicle locator	Unix, C, Visual Basic for client server
GIS	Geographic information system	Unix, NT, ESRI, Oracle, VB
M4	Vehicle maintenance system	Unix, NT, Windows, Oracle, Open Road
Vanpool Information System	Multipurpose system for managing vanpool information such as ridership, subscribers, accounting information	Visual basic
Dispatch	Vehicle assignment	Powerbuilder
ADA Registration and Dispatch	Reservations and scheduling of paratransit service	Trapeze
Timetables and Bus Stops (TABS)	Creates timetables and bus stop sign strips	Open Road, Ingres
DDB	Distribution database; supports federal reporting and helps manage interfaces between Transit systems that share data	Unix Oracle
Metro Online	Agency Web site	Web
Internet Ride Match	Rideshare application for the public	Web

Exhibit 7: Transit Application Architecture
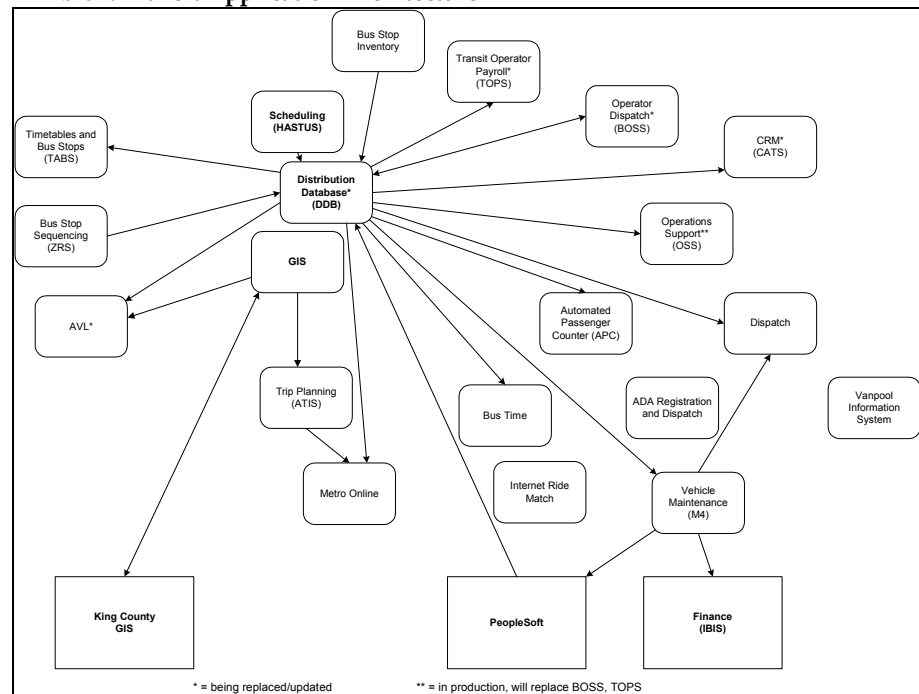
- *Roads Services*

The primary systems used by Roads are listed in Table 17; information is limited to that which was submitted. The relationship between these systems is depicted in Exhibit 8, an architecture diagram developed and used by the Roads division.

Roads uses operating systems that are aging rapidly at 20 to 25 years old. These systems include the Accident Data System and Road Network Inventory. The dated systems have been primarily written in COBOL by internal programmers and require extensive maintenance. While the Roads technology staff are capable of maintaining such systems, some concerns exist related to the few number of personnel who know the programming code. Another system of concern is the Maintenance Management System (MMS). The MMS is written in micro COBOL, which is considered a nonstandard language and requires attention from a third or more of an FTE to ensure that routine maintenance is completed. The Roads systems are becoming increasingly unable to meet the needs of the division, particularly for data sharing. There is also some risk that a systems failure would consume an excessive amount of time to bring the systems back to operational status. The strengths of these systems include being well understood by users and the available functionality developed specific to the needs of the County.

Table 17: Roads Systems

Application Name	Functions
Project Financial Management (PFM)	Procurement/Financial Management Division–wide database program to track revenues and expenditures
CARTS	Customer action request tracking system tracks requests and CCF data and activities
Traffic Accident Online	Tracks long-term traffic accident information
Traffic Device Inventory	Tracks long-term historical information for signs and thermoplastic
Signals and Flashers	Tracks the maintenance, operations, and installation schedule for signals and flashers
MMS — Maintenance Management System	Tracking annual maintenance program for traffic control devices, new construction, and discretionary services
Signs (Sign Log)	Application to track the installation and maintenance activity for signs and thermoplastic
Citizen Action Request	Citizen action request tracking system
Scales	Provides information on road waste material, etc., that is recycled or disposed of

Application Name	Functions
Drainage Tracker	Provides information on project numbers and drainage complaints
Programmatic Permit	Provides information on projects that DDES staff are interested in
Utility Inspection Permits	Keeps track of permits and work done by utilities on the right-of-way
Permit Tracking Data Base	Data associated with project permits
Biological Assessment Tracking Database	Data associated with project permits
Bridges of King County	Bridge inventory data and work-order data
County Road Inventory System	Inventory of county roads (Pavement Management System)
Travel Demand Forecasting	Traffic volumes, vehicle miles traveled, etc.
Transportation Concurrency Management (TCM)	Level of service standards status
Roads CIP Project Tracking Database	Construction, financial, scope, and administrative status of Roads CIP projects
Construction Documentation Management Program	Construction data
Road Network (RNIS) Inventory System	Detailed roadway inventory

Exhibit 8: Roads Existing Application Architecture
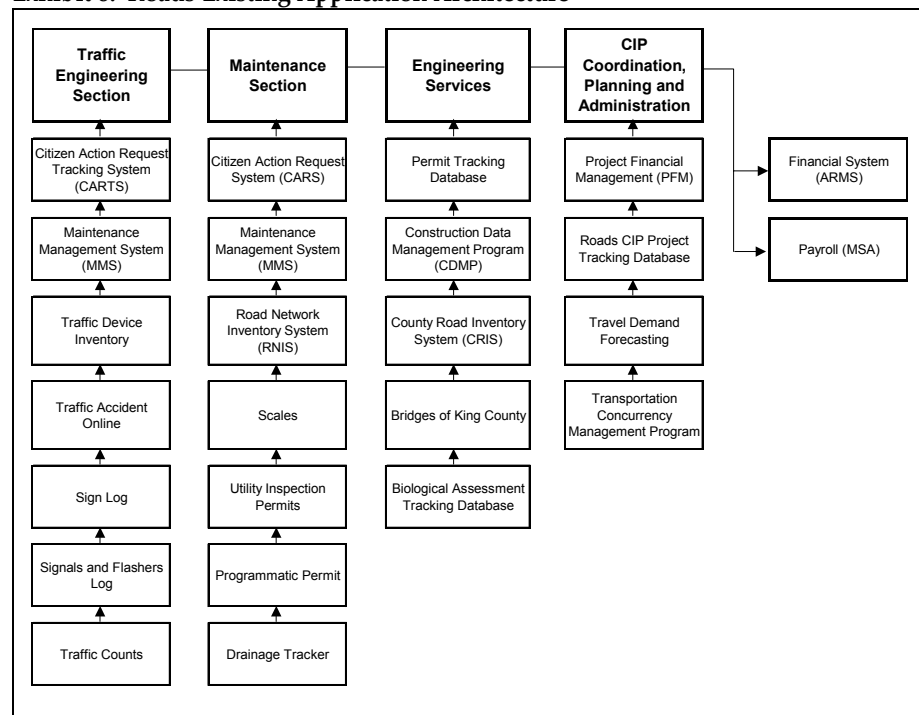
(iv) Department of Natural Resources and Parks (DNRP)

The DNRP operates a variety of network-based and stand-alone applications. While most applications are relatively small, some larger applications are operating within the GIS Center and at the Treatment Plant. Smaller applications run on Microsoft Windows and Apple Macintosh systems. Most of DNRP's systems are considered to be operating satisfactorily. To support such systems DNRP hopes to upgrade NT servers and workstations to move to the Windows 2000 environment, and at the same time to take advantage of expected enhancements to the Countywide WAN. Continued operation and incremental extensions to the current Windows-based network will likely provide satisfactory services into the foreseeable future. Access users are also planning upgrades to more current versions of the software at some point in the future. The department also conducts business with numerous external partners such as the University of Washington, and as such, DNRP share data with its business partners. DNRP applications are identified in Table 18 below and depicted in Exhibit 9.

Table 18: DNRP Applications

Application	Function	Platform
Supervisory Control and Data Acquisition Systems (SCADA)	Monitors and controls treatment plants.	VAX VMS
Laboratory Information Systems (LIMS)	Monitors water quality.	Windows NT
GIS Geographic Information Systems	Records, analyzes, and reports land information.	Unix/Windows
Parks Facilities	Supports recreation programs.	Windows
Project Management	Manages capital projects.	Windows
Administrative Management	Interfaces to ARMS, IBIS, PeopleSoft.	Windows

Exhibit 9: DNRP Existing Application Architecture
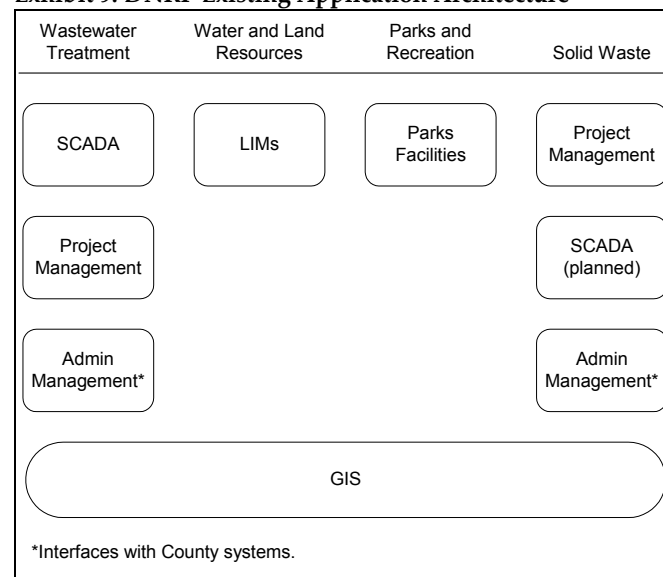
(v) Department of Assessments

Mainframe applications comprise most of the major "administrative" functions that support the Assessor. These applications contain the same core data elements that are utilized by the Finance Department for the tax billing and collections processes. Any failure of the system would be serious for both departments. The mainframe applications require significant ongoing maintenance to keep up with changes mandated by the legislature and the County's business. However, conducting maintenance is challenging because of the age of the application suite and the limited number of staff available to support it. Department management is well aware of this situation and has assigned five staff to the task of migrating applications away from the mainframe. This effort is concentrating on moving applications to the SQL server environment.

From a technical architecture perspective, the segregation of the assessment applications across two hardware platforms requires the business unit to run multiple updates to both sets of databases on a weekly basis. The update process is required in order to keep the two databases synchronized. The process is time consuming and raises the possibility of error. Running multiple hardware platforms also requires additional staff with different skill sets to support the different architectures. Additional Assessor applications have been developed using Microsoft software products, including SQL server, Visual Basic, and Excel. Applications are listed in Table 19 and illustrated in Exhibit 10.

Table 19: Department of Assessments Applications

Application	Function	Platform
AN07	Property characteristics maintenance	Mainframe
ATC001	Seg/merge maintenance	Mainframe
ATC240	Seg/merge legal description maintenance	Mainframe
Street Cleanup	Correct and maintain street names	Client-Server
Real Property	View or update property information	Client-Server
Personal Property	Update personal property accounts	Client-Server
Permit Activity	Enter permits	Client-Server
Personal Property Affidavit	Print GEO and leased affidavits	Client-Server
Sales Identification 2000	Identify parcels to sales	Client-Server
R Appeal Response	Respond to residential appeals; view comparable sales	Client Server
ASC001-ASC720	Tax levy and certification	Mainframe
SC and TR Series Systems	Tax extension	Mainframe
Factor Appraisals	Adjust residential values	Client-Server

Exhibit 10: Assessor Existing Applications Architecture
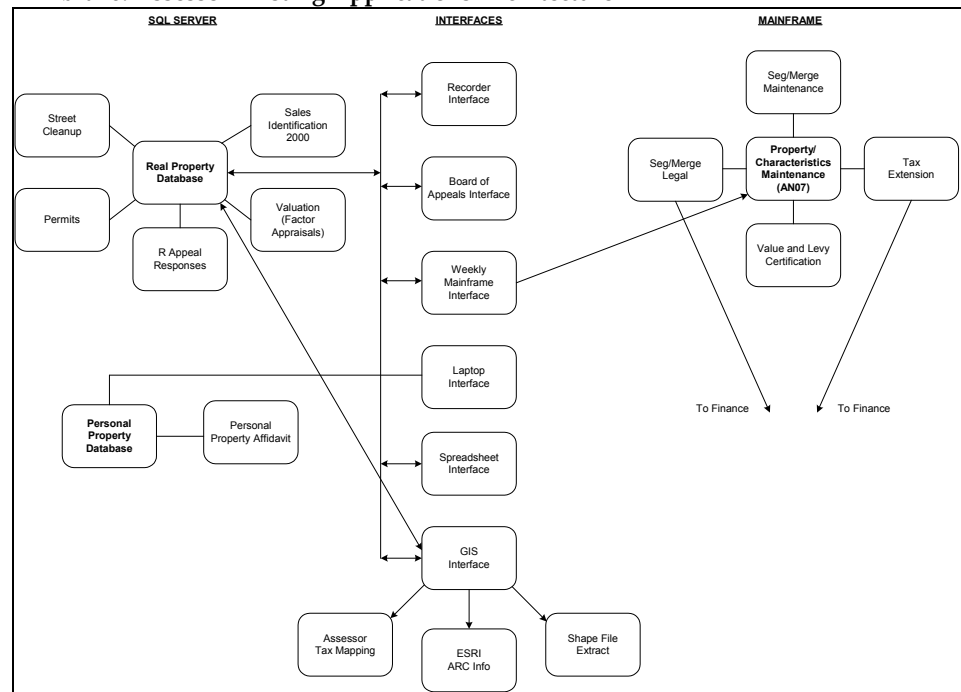
(vi) Additional Legacy Systems

Many other agencies utilize legacy systems. Table 20 provides a partial listing of the County's applications that have been reported as part of this study:

Table 20: Agency Legacy Systems

Agency	System(s)	Function	Database	Programming Language
Adult and Juvenile Detention	Roster Management System	Staff scheduling, payroll, personnel, etc.		Clipper 5.3b
DOT—Roads Services Division	Traffic Device Inventory	Track long-term historical information for signs and thermoplastic in support of inventory and maintenance activities	Mainframe	COBOL
DOT—Roads Services Division	Public Works Purchasing System	Track expenditures for projects, tasks, and organizations	Mainframe	
Information and Administrative Services	Animal Control Complaint/ Dispatch Tracking	Manage and process complaints about animals	ADABAS	Natural

Agency	System(s)	Function	Database	Programming Language
Information and Administrative Services	ITS Billing System	Produce billings of ITS customers for analyst and computer resources	VSAM	COBOL
Information and Administrative Services	Business License System	Issue, renew, and manage business licenses	ADABAS	NATURAL
Information and Administrative Services	Master Street Address Guide	Identify location addresses and assign them to emergency service providers	ADABAS	Natural/ ADABAS
Information and Administrative Services	Pet License System	Manage and process pet licensing	ADABAS	NATURAL and Microsoft C
Information and Administrative Services	Rate Determination System	Develop analyst and computer resources billing rates		SAS, Lotus 123
Information and Administrative Services	Telephone Billing System	Produce billings for telephony-related resources and services	ADABAS	Natural
Information and Administrative Services	Vote Management System (Voter Registration System)	Manage and process registered voters	ADABAS	NATURAL

These legacy systems are generally outdated, difficult to maintain, and are becoming more fragile in terms of stability and reliability.

Strengths:	✓ Systems supplied by third parties are specifically designed to provide unique agency business functionality.
	✓ There is a group of users in counterpart agencies located at other counties in the state and nation.
	✓ When used, third-party application providers provide solutions that are installed at other sites and provide support for such applications.
	✓ Systems have been developed directly to meet the needs of end-users.
	✓ End-user knowledge is high regarding systems' functionality.
	✓ Systems are well understood by the existing users.
	✓ Current systems were developed to meet particular needs of the County.
	✓ Many of the systems are designed to support processing of a large number of transactions.
	✓ There are minimal hardware and infrastructure requirements associated with keeping these systems up and running.
	✓ The supporting mainframe operates reliably and efficiently.
	✓ Current systems appear stable enough to run into the foreseeable future.

Weaknesses:
- ✓ A lack of plan for software in general.
- ✓ No data management plan.
- ✓ Legacy architecture staff knowledge capital loss.
- ✓ A lack of staffing plan to maintain systems.
- ✓ A lack of plan related to maintaining legacy systems.
- ✓ A lack of phase-out strategy for legacy systems.
- ✓ A lack of integrated strategy between enterprise and legacy systems.
- ✓ A lack of middleware.
- ✓ A lack of application portfolio.
- ✓ Obsolescence of legacy technology.
- ✓ Few staff are currently available to support aging software systems.
- ✓ Different standards and designs have been used over the years related to database design and functionality.
- ✓ Supporting documentation is often limited and out of date.
- ✓ Up-to-date data models do not exist to support many applications.
- ✓ System maintenance has not occurred consistently.
- ✓ Software changes are often difficult to make and are expensive.
- ✓ There are concerns about the long-term stability as software ages and is not updated.
- ✓ The user interface is not intuitive in contrast to graphical user interfaces.
- ✓ System upgrade options are limited by older software designs and architecture.
- ✓ Whenever redesign occurs, it is expensive.
- ✓ County programmers supporting some systems (including LS&J) are retiring soon; availability of skilled mainframe programmers is being questioned.

D. Management and Organization

Management is how technology resources, including staff, are managed. Organization includes structure, defined positions, and staffing levels. Several areas related to management and organization are considered to have strategic implications. Weaknesses of particular concern include lack of the following:

- Formal performance measurement, which hinders agencies from knowing where plans, initiatives, projects, and budgets stand during implementation and afterwards
- Designs and plans to guide personnel in development, implementation, and deployment activities
- Project management capabilities
- Centralized, coordinated organization structure supporting enterprise functions and technologies
- Leadership, analytical, and project management skills focusing on the "business side" of technology deployment

Related management and organization discussion is also found in the Service Delivery section of the assessment under Support/Help Desk, and Outsourcing; in Operations under Asset Management; in Architecture under Network and Applications (e.g., GIS); and Funding under Planning for Expenditures.

D1. Training

The training provided to end-users is structured to increase skill sets for the purpose of bringing user capabilities up-to-date with available technologies and ultimately to increase productivity. Training at the County is a decentralized function. Agencies generally take care of their own requirements, which are addressed primarily on an as-needed basis.

Findings:
− Functions lack global management and coordination.
− Technology Learning Center facility is in operation.
− Most users are on their own to find help.
− Significant opportunity exists to strengthen use of funds.

Overall, training is delivered though a variety of venues, including conferences, workshops, and classroom sessions.

Technology training was frequently noted by agency managers as an area of concern throughout this study. While agencies have the latitude to select and train staff as needed, they do not have clear guidelines regarding what curriculum to pursue or how to expend resources. Several agencies stated that training is delivered on an "ad hoc" basis. Agency managers spoke directly to the need for "centralized training standards." Other managers noted needs for more technology knowledge transfer. The scope of existing training efforts for technology staff and end-users is depicted in Table 21 (for those agencies that reported in during the process).

Table 21: Agency Training

Agency	On-Site County Workshops	On-Site Vendor Workshops	Off-Site with Agency Partners	Off-Site Training
Human Resource Management	T, U	T, U		T, U
Adult and Juvenile Detention	U	T, U	U	
Natural Resources and Parks	T, U	T, U		T, U
Judicial Administration	T, U	T		T
Airport Division	T, U		T, U	T, U
District Court	T, U		T	
Fleet Administration	T, U	T, U	U	T, U
Road Services	T, U	T, U	T, U	T
Metro Transit	T, U	T, U		T, U
Prosecutor	T, U	T, U		T
Public Health	T	T		U
Finance	T, U	T, U		T, U
Development and Environmental Services	T			T, U
Information and Administrative Services	T, U	T, U	T, U	T, U
Superior Court		T	T	T, U
Sheriff's Office	T, U	T		T, U

T = Technical Staff   U = End-Users

Generally, the majority of agencies do not allocate specific funds for technology training. Of those that do, the amount specified per employee was mostly minimal. For example, the Airport, Road Services, and the Sheriff's Office budget in the $100 – $400 range per employee per year.

A serious weakness in the County's training program is that while there appears to be adequate training for many of the existing platforms and applications currently in use, these systems are nearing the end of their functional lives. The result being that a number of staff are trained on technologies that are nearly obsolete. The County generally has a skilled workforce but not in the technology that it requires to move to the next level of efficiency and cost-effective performance. An enhanced web-based presence and business information exchange model will require greater training in web development, relational databases, SQL server and the management of such projects. This particular limitation is addressed in the strategies related to enhanced project management and leadership as well as utilization of the Digital Academy.

From a facilities standpoint, the County operates a centralized training center located in ITS. The center is available for use at a rate of $300 per day. Availability has been reported as an issue because of the limited size of the center. In addition, the GIS Center includes training as part of its mission. GIS training resources include a certified training instructor, a training facility, and established training curricula used for County staff and personnel from other outside governmental agencies.

Additional training resources tapped include outside training partners. For example, Netdesk, an external third-party training organization, is utilized for both on-site and off-site training. Netdesk provides ITS with Microsoft certification classes on Microsoft products. Classes are provided to technical staff throughout the County. ITS' Technology and Operations section purchases training segments from Netdesk directly.

Strengths:	✓	Agencies have the flexibility to address their own training needs.
	✓	The County operates a Technology Learning Center.
Weaknesses:	✓	Training is managed tactically versus strategically.
	✓	There is limited crosstraining between agencies.
	✓	Limited formal funding is provided.
	✓	Employees are often on their own to find help.
	✓	Training is not geared towards future technologies the County needs to implement.

D2. Centralized versus Decentralized Structure

County agencies manage and operate technologies centrally in some cases, and decentrally in others. While this hybrid form of management is common in large governmental organizations, it leads to some complexities, including a lack of standardized architecture. The centralized agencies providing services to others

Findings:
− The County's technology organization operates as a hybrid: part centralized and part decentralized.
− Agencies with decentralized technology operations tend to be larger and better funded.
− Decentralized agencies often operate separate, redundant, and overlapping functions.

include ITS, DNR GIS, and Finance. Decentralized agencies taking care of their own business (to varying degrees) include Transit, Sheriff, Public Health, DDES, and DNRP.

There is no consistent organizational model in use at the County related to how technology is managed. This is because technology groups have evolved in an ad hoc manner from small desktop and LAN support groups into larger application support groups. These teams have also evolved at different rates. The trend over the last ten years has been towards a decentralized technology management structure.

Table 22 provides a listing of the technology groups that are in operation today at the County.

Table 22: Technology Groups in King County

Agencies of King County Government	IT Staff
Dept. of Adult and Juvenile Detention (DAJD)	6
Dept. of Assessments (DOA)	11
Dept. of Community and Human Services (DCHS)	1
Dept. of Development and Environmental Services (DDES)	10
Dept. of Executive Services (DES)	
Information Telecommunications Services Division	178
Finance & Business Operations Division	?
Human Resource Division	6
Dept. of Judicial Administration (DJA)	6
Dept. of Natural Resources and Parks (DNRP)	30
Dept. of Public Health (DPH)	26
Dept. of Transportation (DOT)	
Metro Transit Division	51
Road Services Division	9
Fleet Administration Division	2
King County Council (KCC)	2
King County District Court (KCDC)	?
King County Sheriff's Office (SHERIFF)	14
King County Superior Court (KCSC)	8
Office of Information Resource Management (OIRM)	8
Prosecuting Attorney Office (PAO)	10
TOTAL	**378**

This representation was developed from information received during interviews and from surveys and is not a complete picture of all technology staff resources. Staffing numbers include both management and staff. The shaded items are technology groups who have a portion of their technology staff who support enterprise IT functions in addition to specific agency/departmental systems responsibilities:

- Information Telecommunications Services Division have Network Infrastructure, Communications, Finance and HR/Payroll systems;
- Finance & Business Operations Division have Fixed Assets, Finance and HR/Payroll systems;
- Human Resource Division have HR systems;
- Dept. of Natural Resources and Parks have major components for GIS;
- Office of Information Resource Management responsible for technology governance.

Strengths:	✓ To date centralized and decentralized agencies have coexisted for some time.
	✓ Larger agencies have been able to manage and take care of their own technologies.
Weaknesses:	✓ Because agencies have evolved independently, there is some overlap in services being provided.
	✓ Very little top-down planning has occurred within the County to establish an optimum organizational model, balancing what is delivered centrally and decentrally.

D3. Leadership and Management

In the past, technology leadership has been mostly provided decentrally by the managers located within each agency. For the most part, leadership has been provided by administrative and technical managers through the course of everyday business. In some cases, there has been a noticeable lack of attention and direction given to technology. This is evident

Findings:
– Technology leadership has been mostly provided decentrally throughout the County.
– Significant focus has been on maintaining the status quo.
– Day-to-day management is active regarding operations and projects.
– There is a correlation between the size of agency and amount of management occurring.

through the lack of formal strategies, plans, and the time spent moving agencies' computing environments forward.

In contrast to the limited amount of strategic attention, day-to-day management has been more active. Generally, the focus of management has been on maintaining the status quo through systems operations and project implementation. There is a noticeable correlation between the size of an agency and the amount of management taking place. Agency technology management is being provided at both business and technical levels. The dual levels of management are reflected in the types of personnel participating on the Business Management Council (BMC) and Technology Management Board (TMB).

Within larger technology departments, management is segregated by area of specialty. In ITS, for example, managers are assigned to network and systems operations, technology services, applications development and systems support, finance systems and services, and printing and graphic arts functions. In other agencies, there are also managers assigned to oversee technology departments. Often these managers are supported by lead technicians providing support in technical areas such as networking and programming. As identified in the staffing inventory conducted as part of this study, technology manager positions exist in the Department of Adult and Juvenile Detention, Judicial Administration, Public Health, Metro Transit, Road's Services Division, Assessments, GIS Center, District Court, and Department of Natural Resources. Additionally, many of the supervisors, leads, and network administrators conduct management activities as part of their day-to-day responsibilities.

Currently, technology leadership and management within the County is undergoing a change process. With the recent change in the governance process and the establishment of the Office of Information Resource Management, more attention is being paid to strategic issues. With regard to management, improvements are underway related to planning, control, and monitoring.

From a project management standpoint, the County lacks comprehensive resources to ensure that successful outcomes are always achieved. Currently, personnel attend to core activities, including managing tasks, budgets, schedules, and deliverables. While project managers are doing their best to address the basics, more sophisticated project management techniques are not always in place. Particularly lacking is a standard management framework that includes ongoing training, reporting, oversight, established methodologies, and skilled and experienced personnel.

Strengths:	✓ Managers are assigned to oversee technology operations for those agencies that have functions in-house. ✓ Day-to-day organization, control, and monitoring functions are occurring at satisfactory levels. ✓ Focus has been on maintaining viable operating environments and systems. ✓ Project managers are addressing basic needs.
Weaknesses:	✓ Strategic planning has been lacking within the agencies. ✓ Enterprisewide coordination has been lacking. ✓ Focus has been on maintaining the status quo. ✓ An advanced project management framework is not in place. ✓ Standards are missing.

D4. Staffing

Staff counts reported during this study provide an indicator of the size and scope of agency technology operations. Nineteen technology groups are spread throughout the County, ranging in size from 1- and 2-person groups located in the DCHS office of Public Defense and in the Fleet

<table>
<tr><th colspan="1">Findings:</th></tr>
<tr><td>
− Resources are stretched but mostly adequate at current levels.
− Many personnel are technically sound.
− Project management and analytical skills are lacking.
</td></tr>
</table>

Administration Division to 178 in ITS. Sizeable groups exist in the Department of Assessments (11), Department of Natural Resources and Parks (30), Prosecuting Attorney's Office (10), Metro Transit Division (51), Public Health (26), and the Sheriff's Office (14). Other technology staff reside in other places such as the Counts, Assessor's Office, legislative branch, etc. The staffing inventory recorded most positions as being technical in nature, with the majority of position titles defined as network administrator/engineer, PC support/coordinator/ analysis, and help desk support.

Staff roles and responsibilities are depicted in Table 23 for those agencies that provided an overview of staff functions.

Table 23: Representative Agency Technology Staff Positions

Agency	Staff Roles/Responsibilities
Public Health	• Managers/supervisors • Help desk technicians • PC support staff • LAN administrators • Application support and development
DOT — Transit	• Server support • Desktop support • Database administration • Transportation network support • Application support
DOT — Roads Services	• LAN administration • PC coordination • Computer technology specialists

The larger agency groups also maintain higher-skill positions including programmers/analysts, database administrators, GIS programmers/technicians, and applications support leads. While staffing levels appear to be stretched, personnel appear to be getting the day-to-day job done. The most significant challenge appears to be in ITS, where demands are reportedly "outstripping resources." Pending budget cuts are expected to exacerbate this problem. Generally, skill levels across the County appear adequate to operate existing technologies but require improvement in leadership, analysis, and project management. Similarly, personnel seem to be struggling to maintain up-to-date knowledge and skills with regard to newer technologies that are being implemented and on the horizon.

Strengths: ✓ Commitment among staff is strong, especially toward fulfilling the agency mission. ✓ Existing staff are able to meet agencies' most pressing demands. ✓ Many staff have sound technical skills regarding current technologies. ✓ Staff appear to know their assigned jobs well. *Weaknesses:* ✓ Project management and analytical skills are lacking. ✓ Staffing levels appear stretched.

D5. Governance/Oversight

In response to Council and Executive direction, a top-down governance process was established through legislation in December 2000. At that time, the County established a new CIO position and the Office of Information Resource Management (OIRM). The improved governance structure was strengthened in

Findings:
− Beginning to strengthen accountability around County.
− Newly established CIO position.
− Governance being achieved through a participatory committee process involving the SAC, BMC, TMB, and PRB.

July 2001 and has been set up to increase oversight within the County. Several new groups have been established to support the governance effort, including the Strategic Advisory Council, Business Management Council, Technical Management Board, and the Project Review Board. As of winter 2002, these committees are operational and beginning to fulfill their charters. Other ad hoc committees are also being utilized to address particularly current issues the County needs to deal with (e.g., security). The new governance structure has not been operating long enough to test its performance.

Strengths: ✓ Efforts are underway to strengthen accountability. ✓ A new CIO position has been established to provide overall Countywide leadership. ✓ Supporting committees are being established to conduct further analysis in specific areas in need of attention. *Weaknesses:* ✓ The new structure is new and has yet to be fully tested. ✓ Some confusion exists with regard to how the governance process works. ✓ Some agencies are resisting the new level of oversight.

D6. Span of Control/Chain of Command

Span of control relates to the breadth of management, or more precisely, how many personnel one person oversees. Chain-of-command ties to depth, or how many layers exist within an organization. The span of control within the County's technology

Findings:
− Span of control is stretched, contributing to reactive environment.
− Chain of command is adequate through the use of supervisor and lead positions.

groups is fairly large. A rule of thumb in business is that an individual can typically supervise from five to seven people effectively. This number may increase or decrease depending on the type of work conducted and the skill level of staff. The staffing inventory conducted as part of this study determined that managers and supervisors

often oversee six or more personnel, and sometimes over ten. Because of the existing skill levels and clearly defined position responsibilities, the County has effectively increased the span of control, whereby one manager/supervisor is able to oversee a relatively larger number of personnel. The larger span suggests that management attention is spread thin. While the span of control is stretched, the County's structure appears to be working reasonably well. The chain of command appears likewise under control, with a reasonable number of levels existing within the technology organization. The chain of command is held together at the County through supervisor and lead positions. Although County organizational charts are not clear on this issue, it appears that reasonable hierarchies are in place to provide adequate management and maintain viable reporting relationships. In the future, with pending organizational changes and retirements, more attention will be required to manage these functions.

Strengths:	✓	Department organizational configurations have been mostly stable, yielding consistent performance.
	✓	Management has been able to get the daily job done.
	✓	Reporting relationships appear to be intact and working adequately.
Weaknesses:	✓	Because of the high number of staff, management is stretched.
	✓	Organizational configuration does not allow management much time to be proactive, and as a result management is often relegated to operating in crisis mode.
	✓	Routine situations arise when management overdelegates, leaving staff to their own devices to get the job done.

D7. Privacy Management

Privacy is an area that is clearly recognized as being important to the County. Privacy management relates to the way personal information is maintained in systems and kept confidential. Privacy protection is provided to employees as well as external parties including the public and business partners. Agencies appear to be doing a

Findings:
– With the rise of the Internet, privacy protection has become a more important issue.
– To date, privacy protection has been generally managed adequately.
– Privacy is being actively managed to protect different types of data maintained within the agencies.

respectable job managing sensitive data. Internally, for example, the Human Resources and Payroll personnel have long protected personal information. Externally, groups such as Public Health are also protecting personal data, in, for example, the client-tracking system. Privacy appears to be protected at an appropriate level throughout the County, including within the Sheriff's Office, Prosecutor, Courts, and in Finance, where a lot of personal data are handled. The laws surrounding privacy are well known and include acts such as the Public Right to Privacy Act and the Health Insurance Portability and Accountability Act (HIPAA) of 1996, which mandates strict rules regarding patient privacy, coding, and access to records.

The introduction of Internet technologies has added to the complexity of managing privacy. With the explosive use of the Internet, privacy protection has now become a mainstream issue that raises direct concerns about how information is disseminated. The Internet has established beneficial new ways of accessing information, but along with increased access there is also an increased risk of inappropriate use of the same information.

Strengths:	✓	County efforts are now underway to strengthen privacy controls.
	✓	Agencies have managed to protect the County without noticeable incident to date.
	✓	There is a fair amount of knowledge within the County to assess and implement most forms of privacy protection.
Weaknesses:	✓	No one party is currently assigned the responsibility to oversee privacy at an enterprise level.
	✓	The systems protecting the County are piecemeal, underperforming, and fragmented.

D8. Standards

The process of setting technology standards has not been a priority function at the County. Some sporadic attempts have been made to set standards, primarily at the agency level. Efforts have occurred in the areas of PC acquisition and maintenance, data management, Web development, security, and wide area network operations.

Findings:
− A lot of work is needed in the area of standards.
− Standards should be decided before significant work is done in systems design and implementation.
− Standards are a critical part of an asset management function.

Some of these efforts have resulted in substantial documentation being developed, but with little subsequent use. There are few formal, up-to-date standards in effect today, and virtually no enterprise-level standards to guide technology personnel.

Specifically, standards are missing in the critical areas of telephony, equipment acquisition and maintenance, training, disaster recovery, project management, communications protocols, application development, and support. Some recent momentum has been building to promote standards for PC desktops and databases. With the new technology governance process in place, standards are being recognized as being critical to operate the County technologies efficiently and are assumed to be mandatory for enterprise applications.

Given the rate of technological change, standards require frequent review and updates to remain current and useful. For example, standards for PCs and hardware require annual updates. Similarly, standards for operating systems and software must be actively managed to allow for proper maintenance and upgrades to ensure that technology life cycles are optimized and that financial payback occurs. For this reason, standards development is considered to be a critical part of the asset management function that is yet to be developed at the County.

Strengths:	✓	The recently established governance process has set in motion a means to establish standards.
	✓	County personnel are beginning to recognize the need for standards.
	✓	It is anticipated that standards development will occur soon and help guide future decision making.
Weaknesses:	✓	There is no detailed uniform methodology in place to establish standards.
	✓	As of yet, there are few enterprise-level standards available to guide agencies in their efforts.
	✓	Critical standards are missing in the areas of architecture, service delivery, operations, and management.

D9. Planning

Agency planning has been accomplished on two levels: strategic and tactical. While some agencies have attempted to plan strategically, most of the plans are largely tactical in nature. Generally, agencies have had neither the leadership to drive the process, nor the expertise, time, or resources to spend in analysis or development efforts. Some plans that have been developed have

Findings:
– This is often viewed as an unimportant function.
– Planning is missing both strategically and tactically.
– ITS has made efforts over the years to address issue.
– Staff are not well trained in this area.

not been fully implemented. Over the years, several plans have been developed to set strategic direction. ITS has led the central planning efforts. These efforts have resulted in development of the following:

1. *Information Technology Strategic Plan*
   Phase 1: Version 1.1, August 15, 2000

2. *Report on King County Information Technology*
   Strategic Planning, October 1999

3. *King County Information Technology Strategic Plan*
   August 1995

Although these plans were not formally adopted by the County Council, each included some respectable analysis. Several of the key recommendations resulting from the plans were eventually implemented. These plans also laid the foundation for future planning and systems development. Some of the basic components missing in past planning efforts include strategies with action plans and related budgets.

Beyond a few past strategic planning projects, detailed plans have been mostly lacking, especially regarding agency initiatives, changes in architecture, and large projects. In particular, designs that support the network, applications, database architectures, etc., are conspicuously absent. Similarly, action plans and corresponding budgets components are also noticeably missing.

For the most part, in cases in which planning has occurred, it has been addressed on a project-by-project basis. In general, non-CX agencies such as the Department of Natural Resources (DNRP), Department of Transportation (DOT), and Public Health have access to outside funds and additional resources, and as a result conduct planning periodically. Partially because of the grant-funded opportunities and grants-application processes, they are more involved in planning activities than other agencies. Transit is an example of one agency that conducts planning at reasonable levels. With access to dedicated funding, Transit conducts regular multiyear capital planning. Another example of where personnel are increasingly recognizing the need to plan is within the Law, Safety, and Justice arena. LS&J agencies are currently engaged in a major systems review project, targeted at workflow integration. In addition, the Sheriff's Office recently contracted with an external consulting firm to develop a strategic technology plan, which was completed early in the first quarter of 2002.

Strengths:	✓ Some agencies (primarily non-CX) have developed plans over the years.
	✓ Planning is recognized as necessary to support the annual budgeting process.
	✓ ITS has initiated several planning efforts over the years that have yielded important analysis.
Weaknesses:	✓ Both strategic and tactical plans are lacking.
	✓ Staff are not well trained to conduct planning.
	✓ Smaller CX agencies are the least likely to plan on a regular basis.

D10. Business Analysis

County personnel currently conduct business analysis at modest levels. Analysis involves evaluating business processes, requirements definition, modeling, design, and alternatives review. Agencies approach analysis differently, using various methodologies. The methodologies used include assessing and

Findings:
– Few personnel have formal training or experience to conduct business analysis.
– Challenge of aligning business processes to technology is significant.
– Staff are often trained to address technologies rather than business needs and workflow.

improving existing processes, matching processes with automated systems, and improving the design and selection of computer systems. Other important components of business analysis include cost/benefit analysis, market assessment, prioritization, and understanding end-user needs. These latter components are typically not addressed in great depth. Some agencies conduct analysis fairly regularly to make certain types of system decisions. For example, analysis has preceded changes to Oracle/PeopleSoft reporting, GIS, Transit, and LS&J applications. In cases where proper analysis has not been completed, projects have sometimes stalled or resulted in an inappropriate outcome. A primary example of a past challenge related to business analysis is the difficulty agencies have had reaching consensus on business requirements related to integration approach.

The importance of conducting proper analysis should be considered significant. Analysis directly impacts the way business is conducted within and between agencies. From a technology standpoint, few personnel have extensive formal training or the experience to conduct in-depth business analysis. Representative areas in which further analysis is required are in the areas of Budgeting, Procurement, Human Resources/Payroll, Finance/Accounting, and within Law, Safety, and Justice. The lack of analysis heavily contributed to the past failure of the ERP implementation, and if not directly addressed, will again significantly impact future projects and increase the potential risks within projects. The need for strengthened analysis is not well understood among staff; and while managers often have a notion that this is an important area, executive management has yet to fully recognize the importance of this issue.

Strengths:	✓ The County conducts systems requirements definition as a routine part of development efforts. ✓ Various methodologies are in use, indicating that some level of evaluation is occurring.
Weaknesses:	✓ Business analysis is not performed across agencies where it could be used to promote cross-agency system efficiencies. ✓ Business analysis and modeling are not occurring at sufficient levels to adequately support decision-making processes. ✓ Risk analysis is often left completely out of the picture. ✓ Formal training has not been obtained.

D11. Telecommunications

Telecommunications management includes overseeing the functions associated with delivering telecommunications services. Functions range from project management to installing and testing systems. Other work involves performing moves, adds, and changes as well as maintenance of systems and infrastructure.

Findings:
– Systems are disaggregated.
– Requires an integrated design.
– There is long-term potential for quantifiable benefits if managed properly.

Within the County, telecommunication requirements have evolved along with the County's business model and technical capabilities. For example, when the County and Metro merged in 1996, management changed significantly because of the need to operate multiple dissimilar phone systems. As in other areas of technology, telecommunications management is shared among the agencies involved. This hybrid approach has resulted in an overall telecommunications management structure that is fragmented and often uncoordinated. While individual agencies have devoted substantial resources to telecommunications operations, agency efforts are still disparate and not orchestrated according to a Countywide set of standards, policies, or operational controls.

As it stands now, agencies autonomously specify the classes of voice services applicable to individual employee positions. Each agency has an assigned staff person responsible for telecommunications. However, agency functions are generally not formally defined or documented. Assigned employees are on their own to filter and coordinate changes, add or remove services, and make repair calls.

Similarly, the information maintained about each telecommunication system varies by agency as well. As a result, the separate telecommunications databases do not provide the information necessary to support effective operations management. For example, existing databases do not specify the location of Public Switched Telephone Network (PSTN) facilities within a given building, or designate the fire and security alarm circuits that are in place. Because each agency controls so much of its telecommunications infrastructure, budgets/expenditures are managed at the agency level. While this makes sense under a decentralized model, it impedes the ability to set and enforce standards and manage services consistently from an enterprise perspective.

Centrally, the Distributed Computing Section (DCS) of ITS has the responsibility for managing telecommunications networks and providing services to the desktop to over 100 locations. Service orders are routed through DCS, and system changes are made according to defined operations standards. To support this model, ITS has established station-level user pricing as a way of allocating voice telephone services costs to agencies. Such pricing allows for flexibility in making subsequent adjustments based on any system reconfigurations or changes in equipment ownership. Additional support services are outsourced under maintenance contracts with Qwest, NetVersant, and Verizon.

Strengths:	✓	There is a clear intention within the Distributed Computing Section of ITS to improve operations system and services.
	✓	Station-level user pricing enables flexibility for adjustments in systems configuration and ownership.
	✓	Although the Distributed Computing Section has identified critical problems and operations needs, its customers are still generally satisfied.
	✓	The County-operated Public Safety Answering Point (PSAP) has experienced Nortel-trained telecom coordination that works well.
Weaknesses:	✓	Telecommunications management is generally fragmented around the County.
	✓	Disparate telecommunications systems databases do not provide complete information essential for operations management.
	✓	Services are not managed consistently or from an enterprise perspective.
	✓	Telecommunications policies and procedures are not well developed or documented.

D12. ITS Organization

ITS is the County's centralized technical service group, with over 150 employees operating out of the 16th, 18th, 23rd, and 24th floors at Key Tower. The organization is primarily structured around six groups:

Findings:
− Personnel are trained well technically, providing a solid technical operations group.
− In the past, ITS has been positioned as a technical support group versus "leading-the-way" for the County.
− There is a history of reactive support.

Network and System Services operates and maintains the wide area network at over 215 sites throughout the County and provides systems administration for hosted applications. This group was reorganized in January 2002 to become more streamlined and includes about 36 FTEs. Group functions include network engineering, administration, managing the network operating center, and systems engineering.

Operations primarily runs the data center housing the mainframe and colocated servers. Group functions include scheduling, production control, and data entry. Approximately 26 FTEs support this group.

Technology Services provides LAN support for several County organizations and Countywide messaging and telecommunications functions. This group includes about 23 FTEs concentrating on physical systems that support agencies' distributed environments.

Applications Development and Systems Support focuses on supporting major legacy software systems, including Law, Safety, and Justice, and small platforms as well. The Web team is a key part of this group. Group functions include development, integration, and maintenance of approximately 150 systems, about equally split between the mainframe and distributed systems. The overall group consists of approximately 47 FTEs.

Finance Systems and Services provides basic administrative services to ITS, including procurement, accounting, financial reporting, facilities management, contract management, human resources, and planning and budget functions. Seventeen FTEs support this group.

Printing and Graphic Arts provides printing, high-volume copying, and graphic arts and multimedia services. This group includes approximately 18 FTEs.

Additionally, a customer service function is under development. ITS has also recently filled numerous management positions, including the Assistant Manager (1/02), Operations Manager (9/01), and Applications Manager (12/01). As of 1/1/02, ITS is now part of the newly reconfigured Executive Administrative Services agency.

During the planning process, significant feedback was obtained from agency end-users related to their dealings with ITS. The feedback is considered important because it affects the relationship between the agencies and also impacts the level of business that may be conducted in the future. Several ITS issues require further attention, including available capabilities to service nonmainframe applications, frequent organizational changes, ongoing procedural changes, interruption of service delivery and/or inconsistent service, staffing levels, and the ability to provide support in a timely fashion.

Strengths:	✓ ITS is viewed as a valued provider of specific enterprise services, including WAN, e-mail, telecommunications, and Internet hosting.
	✓ For a select set of clients, ITS provides continuing support to applications that are running on the County's mainframe.
	✓ ITS provides development and continuing support for client-server and browser-based applications.
	✓ Upon request and as necessary, ITS will supply term-limited temporary employees (TLTs) or contract technical resources to other agencies to augment staff.
	✓ Personnel are well trained technically, particularly in supporting current Operations.
Weaknesses:	✓ ITS has done little to advertise its expertise in other than mainframe and enterprise areas.
	✓ ITS services have not always been available on a timely basis.
	✓ ITS' reputation has been impacted by —
	• A history of focusing on mainframe applications;
	• A series of organizational changes;
	• Inconsistent definition of services;
	• Some inconsistencies in the level of service provided.
	✓ A history of reactive support.

E. Funding

Funding includes budgeting and accounting practices, capital financing mechanisms, and charge-back rate models. While some capital projects continue to have reasonable funding levels, the County has not followed up with adequate operational funding to properly maintain technology. An even more basic funding issue is the lack of accounting that exists related to technology. Technology planning, budgeting, and ongoing accounting at the County are considered to be areas of weakness. As a result, the County is not in a position to track the total costs of ownership, conduct proper cost/benefit analysis, or implement meaningful performance measurement systems.

E1. Ongoing Funding

Frequently agencies are building systems and covering capital expenditures, but then are not paying much attention to the issues and costs associated with ongoing operations and maintenance. This approach appears to be driven by the higher relative priority of direct program activities. The lack

Findings:
– Capital funding has been provided, while operating funds are often lacking.
– Situation is exacerbated within CX agencies.
– While some managers knowingly make these decisions, many are unaware of long-term ramifications of underfunding maintenance.

of planning for ongoing funding is particularly noticeable in CX agencies, where maintenance and equipment replacement is often deferred.

Significant capital funding has continued to be made available up through the current year. Additional capital funds have been requested for projects at ITS, DAJD, District Court, Judicial Administration, Transit, Human Services, Finance, Elections, Public Health, OHRM/Finance, and DNRP. 2002 funds requested total over $22.5 million. While capital funds are being requested outright, future operating funds associated with the same projects are unplanned and are generally expected to be provided out of agency program budgets. Because of the size of some planned projects, some moderate amounts of additional operating funds should be anticipated to be needed to support continued operations and maintenance. The result of unplanned or underbudgeted operating activities has a threefold impact on the County. First, when maintenance is needed, funds are not always available and maintenance activities are sometimes deferred. Second, when maintenance eventually does occur, costs are often higher than they would otherwise be. Third, some of the computer assets that are neglected perform at lower than expected levels and impact end-users' job performance. Many times agency managers knowingly direct funds away from technology. Just as often, however, managers do not recognize what it takes to continue to support technology. While managers intuitively know that maintenance is something that they should pay attention to, the same managers often do not have a good understanding of the impact of long-term underfunding, which often results in the agencies' incurring greater costs in the long run to catch up and repair and/or replace systems.

Strengths:	✓ Direct service delivery to the public is a funding priority.
	✓ Capital funds are being requested and provided to further advance the state of technology.
Weaknesses:	✓ Frequently agencies are not paying enough attention to the issues and costs associated with ongoing operations and maintenance.
	✓ The result of not planning has a threefold impact. First, when maintenance is needed, funds are not always available. Second, when costs are incurred they are often higher than they should be. Third, computer assets are sometimes neglected.
	✓ The lack of operating fund availability is particularly apparent in CX agencies.

E2. Planning for Expenditures

Almost every agency developed a business plan to support their 2002 budget requests. The purpose of such plans was to identify core programs and services, including a definition of vision, mission, goals, and related outcome measures. Technology was occasionally discussed

Findings:
− No comprehensive long-term technology budgets are available at either the agency or Countywide levels.
− Future estimated expenditures and funding requirements are unknown.

within such plans, but the analysis was usually limited. A few agencies also have recently developed technology plans. Agencies' plans include the Sheriff's Office, Wastewater Treatment and Transit. The contents of these technology plans also varies;

those that have been produced include a definition of pending projects, sometimes supported with budget numbers. Generally, the linkage between agency business and technology plans is lacking. And because technology plans are mostly missing, there is limited strategic and tactical analysis available to identify what agencies are planning in terms of technology projects and budgets. Without such plans and budgets, agencies are not in a position to assess the long-term financial impact on their organizations. Under these circumstances, future Countywide expenditure requirements are unknown.

Strengths:	✓	Most County agencies developed business plans in 2001.
	✓	A few agencies also have developed up-to-date technology plans.
Weaknesses:	✓	Occasionally technology was referenced within plans, but the analysis was usually limited.
	✓	Overall, the linkage between available business and technology plans is lacking.
	✓	There is limited strategic and tactical analysis available defining where the agencies are going in terms of technology.
	✓	Very little work related to developing multiyear technology budgets is being done.
	✓	There is a lack of a standard approach and format related to plans.

E3. Financing

Until the early 1990s, the County developed and implemented technology on a piecemeal basis. The financing of such technology was also accomplished in pieces and largely absorbed into the agencies' annual program budgets. Beginning in 1993, the County funded technology advancement in larger increments through the use of debt

Findings:
− Until the early 1990s, the County financed technology change through the normal course of doing business.
− Beginning around 1993, the County began to finance technology through the use of debt.
− Debt still appears to be the most obvious source of funding to tap in the near future.

financing. The first wave of change occurred in 1993—94, when the County began to network the agencies together. Bond financing generated around $11 million during this period. The second large wave occurred around 1996. At this time the County was operating from a technology plan that defined dozens of projects to meet particular agencies' requirements. Bond financing generated in the range of $32 million and was disbursed to individual agencies to spend on their own projects. The most recent significant round of financing occurred in 1998–99. The purpose of this funding was specifically to address the pending financial system acquisition, election systems acquisition, and Y2K upgrades. In total, County bond financing provided approximately $95.7 million from 1993 to 2001. Most agencies are funding technology through both operating and CIP budgets; however, exact amounts are unknown, as agencies have not tracked expenditures in detail.

The County has chosen a path to fund technology largely through debt financing. Many other governments fund technology on a pay-as-you-go basis and/or through reserves. Some consideration should be given to approaching technology financing through more conservative measures.

Strengths:	✓	The County funded approximately $95.7 million from technology bond funds from 1993 to 2001.
	✓	The County has additional revenue-generating capabilities through its debt capacity.
Weaknesses:	✓	Historical approach to expenditures does not readily allow for reserve buildup.
	✓	Budgets and financing requirements for technology are not well documented.

E4. Accounting

Generally, County agencies have done a poor job accounting for their technology expenditures. Particularly lacking is an accounting for specific types or categories of expenditures. Accounting detail is also lacking regarding where funds have been spent. The lack of accounting is not a result

Findings:
− County agencies do not account for technology expenditures at an adequate level of detail.
− The County is not in a position to know what its total costs of ownership are related to technology.

of limitations in existing systems, rather the current approach has its roots in program accounting, which has not been updated to recognize the large increase in technology expenditures that have been spent over the last decade. Because agencies do not track detail, it is not possible to accurately determine how much is being spent or the total cost of ownership (TCO). And because TCO is unknown, the County is not in a position to know whether good investments are being made. Typically governments track more information about technology expenditures than King County does. This information is normally expected to be available with a reasonable level of detail and produced on a timely basis.

Strengths:	✓	System capabilities exist to track detail should the County desire to do so.
Weaknesses:	✓	Generally, the County has done a poor job of accounting for technology expenditures.
	✓	Agencies do not track expenditure detail.
	✓	Total cost of ownership is not known.
	✓	Performance measures are largely missing related to expenditures.

E5. Charge-Back Mechanisms

On a regular basis, agencies provide resources and assistance to each other, including in the area of technology. Because of the amount of resources involved, agencies reimburse each other for the cost of such service. The agencies that provide significant assistance include Finance, DNRP, and ITS, among others. Several mechanisms are used to recoup the costs of such service. Mechanisms include direct billings as work is completed and/or at appropriate intervals; internal-service funds

Findings:
− The agencies that provide assistance to each other include Finance, DNRP, and ITS, among others.
− Each year rates are recalculated based upon historical experience and expected costs for the next year.
− Charge-back mechanisms have been refined over the years and appear to be working reasonably well.
− Charge-back systems will not resolve any of the County's strategic issues.

where cost bases are used to estimate, track, and obtain reimbursement; and enterprise funds that operate like internal-service funds, but have been established separately to account for revenues collected to support specific services.

Because of the number and different types of services provided between agencies, there are dozens of interfund transfers that occur monthly. The cost-accounting approach used at the County tracks a fair amount of detail, and this approach appears to work well for the County. The underlying philosophy used by agencies for charge-back purposes is to "recover costs fairly." Technology charge-back rates are planned such that one fund will not benefit from another, and that costs will not be billed inappropriately. Many types of service rates are calculated on an annual basis with rates set to recover direct costs plus an overhead factor. Each year most of these rates are recalculated based upon historical experience and the anticipated level of future service to be provided. Charge-back mechanisms have been refined over the years and appear to be working reasonably well. The staff resources expended to account for such expenditures also appear properly allocated.

Strengths:	✓	Agencies reimburse each other for the cost of assistance provided.
	✓	Service rates are tracked at a detailed level.
	✓	The basis used for charge-back is to recover costs fairly without being unduly burdensome.
Weaknesses:	✓	The charge-back process is not widely understood.

VI.   Strategies

The technology strategies developed during the strategic planning process cover a wide territory. Strategies have been developed in four major functional areas: service delivery, operations, architecture, and management and organization. The strategies were first introduced in the Executive Summary embedded within the guiding principles. The strategies are discussed below in terms of timing and then in detail in the following sections by functional areas.

The planned transition of the County's technology is being structured into three phases.

> **Phase One: "First things first,"** with the goal of establishing a proper management and technology foundation for subsequent growth, enhancement, and implementation processes.

> **Phase Two: "Beginning the march,"** with the goal of deploying new enterprise and e-government applications. In addition, this phase addresses needs for critical new infrastructure prioritized in terms of the value to be delivered to end-user communities.

> **Phase Three: "Long-term initiatives,"** with the goal of successfully deploying major and complex technologies that will move the County forward with the digital age. This phase will initiate as work is underway for Phases One and Two, but will progress in an incremental and phased manner to avoid the pitfalls of hasty and poorly planned implementation that has plagued government in the past.

The timing of strategy implementation is important. Some strategies are considered dependent on others, and should not be implemented until prior work has been completed. For example, implementation of the Internet, intranet, and extranet; hardware consolidation; Law, Safety, and Justice; and commercial packaged software strategies are all dependent on defining standards for such technologies during Phase One. The three phases are depicted in Table 24 below along with timing and a definition of outcomes for each phase.

Table 24: Strategy Phasing

Phase/Strategy	Year			
	1	2	3	4 (and beyond if relevant)
Phase One – First things First				
A1. Utilize service-level agreements as a standard way of doing business.	■	■	→	→
A3. Utilize the State of Washington's Digital Academy to promote learning.	■	■	→	→
B1. Establish a comprehensive asset management function.	■	■	→	→
B2. Develop standard operating procedures to guide all agencies' technology staff.	■	■	→	→
B3. Strengthen system security.	■	■	→	→
B4. Strengthen business continuity capabilities.	■	■	→	→
C1. Standardize technology including infrastructure, hardware, and applications software.	■			
C2. Standardize Web-based technology used on the intranet, Internet, and extranet.	■	→		→
C3. Standardize County technical approach for application integration.	■			
C4. Purchase and integrate top quality, commercially packaged software where possible and cost effective.	■	■	→	→
C7. Institute Countywide best practices for enterprise data management.	■			

Phase/Strategy	Year 1	2	3	4 (and beyond if relevant)
D1. Institutionalize performance measurement for technology.	Planning			→
D2. Develop technology design/plans for significant initiatives and projects.	Planning			→
D3. Establish a comprehensive project management methodology.	Planning	Impl.		→
D5. Strengthen technology management and delivery capabilities through specialized training.	Planning			→

PHASE ONE OUTCOMES – ESTABLISHED TECHNOLOGY MANAGEMENT FOUNDATION

• Implemented service level agreements • Knowledge gained at the State's Digital Academy • More secure network • Formalized asset management • Developed SOPs • Developed plans addressing business continuity • Defined standards • Cost/Benefit analysis and decisions related to data management and approach to integration • Agreements and methodology to acquire and implement packaged software • Established use of performance measurement • Technology designs and plans developed • Defined project management methodologies •

Phase Two – Beginning the March

	Year 1	2	3	4
A2. Reorganize the help desk function around a more centralized, streamlined, and coordinated model.		Impl.	Impl.	→
A4. Use the Internet as a primary mechanism to deliver public information and services.		Impl.	Impl.	→
A5. Promote and support the development of the employee intranet and partner extranet to improve information services and business process support.		Impl.	Impl.	
C5. Consolidate hardware around the County.		Impl.		

PHASE TWO OUTCOMES – ENHANCED HIGH PRIORITY SYSTEMS AND FUNCTIONS

• Reorganized centralized help desk function • Increased use of the Internet, intranet, and extranet • Consolidated hardware • Strengthened technology personnel capabilities •

Phase Three – Long-Term Initiatives

	Year 1	2	3	4
C6 Use broadband technology and a fully integrated PBX architecture as the future centerpiece to converge data, voice, and video transport.	Planning	Impl.	Impl.	→
C8. Design and implement a common architecture to integrate workflow between Law, Safety, and Justice agencies.	Planning	Impl.	Impl.	→
C9. Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.	Planning	Impl.	Impl.	→
D4. Reorganize technology functions around the County.	Planning	Impl.	Impl.	

PHASE THREE OUTCOMES – IMPLEMENTED LONG-TERM TECHNOLOGIES

• Implemented enterprise HR/Payroll and Financial applications • Integrating Law, Safety, and Justice agencies' workflow • Use of broadband to converge technologies together and new PBX design and systems • Reorganized functions •

END STATE – 21ST CENTURY ORGANIZATION SUPPORTED BY INTEGRATED, STATE-OF-THE-ART, WEB-BASED SYSTEMS

• Increased accountability • Trained personnel • Strengthened technology leadership • Integrated business processes within and between agencies • Formalized approach to technology management • Increased use of the Web to deliver information, services, and as a means to conduct business • functioning enterprise systems linking the County together • Converged voice, data, and video business functions •

Legend:

Planning (if relevant)	Implementation	Ongoing (if relevant) →

The first phase, "first things first," is set to establish a proper foundation from which to build and deploy new technologies. This is a phase in which important preparation activities will occur in order to properly position the County prior to implementing major new systems. This phase includes establishing standards and using them for effective planning and design. The standards established in Phase One will address infrastructure, hardware, applications software, Web-based technologies, data management, and the approach to application integration. Additionally, where relevant, standards will also be established to guide operations and maintenance activities. Many of these standards may be documented in the form of standard operating procedures (SOPs). Additional Phase One strategies include establishing service-level agreements, strengthening business continuity planning and security, establishing an asset management program, utilizing the State's digital academy, institutionalizing performance measurement, strengthening management and delivery capabilities, and enhancing project-management capabilities.

The second phase relates to building and implementing high-priority systems. This phase marks the "beginning of the march" toward deploying new enterprise systems as well as other needed infrastructure including e-government applications. During this period, Internet utilization is expected to expand, providing increased information access and services to the public, business partners, governments, and employees. The employee intranet and partner extranet will also see development to improve services and business process support. Specific strategies targeted for implementation include the reorganized help desk and consolidated hardware. The strategies targeted for the second phase are a high priority for the County. Phase Two prioritization is tied to the potential for high payback, relative ease of implementation, addressing problems that require resolution, and the next steps regarding technology implementation.

The third phase of the transition plan focuses on longer-term initiatives. This group of strategies is more complex and therefore is anticipated to require years of elapsed time to implement. This phase includes using broadband to achieve convergence; integrating workflow between Law, Safety, and Justice agencies; full utilization of HR/Payroll and Financial systems; and reorganizing technology functions around the County.

The three phases described above are interrelated. Thus, once the first phase activities of standards setting, planning, design, and decision making are well underway, Phase Two activities will begin. Phase Three work may also commence before Phases One and Two are fully complete, but because of the complexity and evolving nature of the subject area, the strategies are planned for implementation over an extended period. The overall phasing recognizes that the County is not positioned to conduct all of this work simultaneously because of resource constraints. The phasing is intended to balance workloads, expenditures, and the capacity to manage technology deployment.

Strategy Organization

The strategies described in the remainder of this document are defined to establish a new technology direction for the County. These strategies are designed to address (1) established business goals, (2) defined needs, and (3) the gap between such goals/needs and existing conditions within the County. The strategies define directions that will have a major impact on the County in terms of service delivery and resource allocation. Strategies were defined by comparing needs, goals, and objectives against the current technology environment, reviewing the gap between them, and then by assessing overall deficiencies. Based upon the gap of the issues identified in the study process, the most significant problems triggered development of specific strategies as defined herein.

Each strategy discussed is comprised of five components. First is the strategy *recommendation*. The recommendation is a statement of direction for the County to follow. Second is a *discussion* of what the strategy means. Third is a table with *summary indicators* related to timing and of how difficult it will be to implement the strategy. Indicators summarize difficulty as "High," "Moderate," or "Low." Fourth is a *business case*, which is a group of arguments that support going forward with the recommended strategy. The business case includes numerous items including summary discussion with cost/benefit elements where relevant; notation of related technology needs, business goals/objectives, and deficiencies met by the strategy; and cost and payback factors noting whether the strategy has high, moderate, or low cost, and payback. Business Goals and Objectives are detailed in Section II of the Appendix. Technology needs are likewise detailed in the Needs Summary located in Section III of the Appendix. Deficiencies are defined within the Technology Environment section of this report. Fifth, the strategy definition concludes with three additional items grouped together, including an *action plan* (in the form of a Gantt chart), *three-year summary cost table* with order of magnitude costs, and a bulleted list of *performance measures* under a category called "outcome measurement."

The defined costs supporting the strategies are stated at an order of magnitude level only. The costs have been defined at the highest level of planning and are considered conceptual from a planning standpoint. Costs have not been defined at an implementation planning level. Further, costs are incremental in nature, adding core technology capabilities to that which exists today. Costs must be verified and analyzed at a more specific level based upon detailed requirements definitions. The costs should be considered as rough estimates to be used for comparative planning purposes. As such, future verification should include analysis prior to going forward with strategy implementation. Costs have been derived through a combination of sources including past studies, preliminary research, planned costs already estimated within the agencies, and, in some cases, vendor input. Cost detail and assumptions for each strategy are listed in the plan appendix. Given the preliminary nature of these estimates, Moss Adams does not guarantee that these costs will synchronize with detailed requirements yet to be defined by the County. As detailed project plans are put into place, costs are expected to be refined, especially as related to County's staff time required during implementation. During detailed cost planning, all significant projects should proceed through the County's project approval process to confirm project feasibility and determined available funding sources.

A. Service Delivery

Five service-delivery strategies have been developed. Subject areas are the following: service-level agreements, help desk organization, using the State's Digital Academy, expanding the use of the Internet for the public, and promoting and supporting the employee intranet and partner extranet. Related to service delivery, strategy development weaknesses of particular concern include the lack of the following:

- Formal agreements between service providers and customers, in which performance commitments and expectations are set and documented in the form of service-level agreements.
- Coordination between the various help desk functions that are located around the County.
- Knowledge about Web technologies and the resulting impact on system development and deployment.
- Progress related to deployment of specific applications on the Internet providing public information and services.
- Migration of the County's technology embracing the employee intranet and partner extranet.

A1. Utilize service-level agreements as a standard way of doing business.

Service-level agreements (SLAs) are contracts between technology service providers and their customers. The focus of these agreements is to make commitments under which service providers will perform. These agreements are typically straightforward and designed to provide a degree of certainty to the customer related

Timing: PHASE ONE	Difficulty: LOW
– Time is needed to establish agreements.	
– Will require analysis to determine appropriate level of service and compensation.	
– Some negotiation will be required to define mutual commitments.	

to resource availability and types of services to be provided. In return, service providers obtain a commitment by the customer to pay for the level of services agreed to, thus making it easier to plan and provide for resource deployment (e.g., skills, number of staff, up-to-date hardware, etc.).

The approach to developing service-level agreements within the County will entail establishing a framework from which different types of services may be defined along with the performance parameters that will apply. While particular agreements may differ for such areas as the help desk and network support, the same general framework may be used to establish the agreements. Agreements may then be used to gauge service and guide the parties' actions. The agreements may also be renewed regularly and apply to intra-County service providers and external vendors alike.

BUSINESS CASE

The benefits for the County of conducting business against the backdrop of service-level agreements are tied to clarity of the business relationship between the provider and the customer (i.e., in this case agency end-users). Service-level agreements provide a clear definition of what services are to be provided and what compensation will be paid in return. Agreements set clear expectations between the parties and will often improve customer relationships as a result. One of the most important benefits achieved is that the service provider can properly plan for allocation of certain levels of resource. This defined set of circumstances will optimize resource allocation for the provider and maximize productivity for the customer.

The costs required to define, implement, and maintain service-level agreements include the efforts to define and test benchmarks, develop agreements, and manage the agreements once they are in place. The time involved may add up but will be spread across those responsible for managing and delivering particular types of technology. For example, those managers responsible for training, support, help desk, and operations functions may lead the efforts to define, negotiate, and establish the agreements. Likewise, customer representatives are required to negotiate and track their side of the agreement(s).

Often organizations use service-level agreements because of a major change management wants to initiate. A regional example is the Grant County PUD, which in the late 1990s used service-level agreements to change the way service was delivered. The PUD used the negotiation process around establishing service-level agreements to reset expectations, optimize resource allocation, and eventually reduce the number of staff employed. Partially through the use of service-level agreements, the PUD successfully changed its business model and began servicing the organization with fewer staff.

Nationally, service-level agreements are becoming a standard way of documenting services to be delivered, along with performance expectations. An article in the 1998 issue of *CIO* magazine supports the utilization of such agreements, stating that "SLAs have evolved to a new level in the last few years, becoming more broad-reaching and bilateral." While they are not universal, agreements and knowledge of how to implement them are becoming a larger part of standard practice.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Proactive Service Delivery • Service-Level Commitments	• Improve/Expand Services • Establish Communication and Collaboration • Define Metrics and Performance Measures • Integrate and Establish Partnerships	• Few service-level agreements exist across the County. • Those that are in place are not actively managed. • ITS services have not always been available on a timely basis.

Costs:					Payback:		
Low	Moderate	High			Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Identify technologies requiring SLAs	▓											
2. Assign responsibilities to develop	▓											
3. Define customer requirements	▓	▓										
4. Assess current services	▓	▓										
5. Align with expected service levels		▓										
6. Analyze costs		▓										
7. Negotiate terms			▓									
8. Develop SLAs			▓	▓								
9. Execute agreements				▓								
10. Adjust provider resource mix (as required)				▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	200,000	100,000	
Operations:			
Total:	200,000	100,000	

Capital Costs: Years 1 and 2.

Operations Costs: Absorbed internally thereafter.

OUTCOME MEASUREMENT

- Service performance in alignment with customer expectations (as surveyed)
- Number of service-level agreements developed and actively maintained
- Problem resolution time

A2. Reorganize the help desk function around a more centralized, streamlined, and coordinated model.

Two main points requiring attention in this area are to (1) provide a central point of contact for all users, and (2) coordinate service delivery among the dozens of technicians dispersed throughout the County. The benefits of reorganization will be to increase service delivery by providing resources in areas where they have been limited in the past, and strengthen coordination between service providers, thus becoming more efficient in terms of resource sharing and responding to requests for assistance. This greater efficiency could result in a decreased cost of per-incident support.

Timing: PHASE TWO	Difficulty: LOW-MODERATE

- Must find new resources to staff the function.
- Expanded skill sets will be needed to be able to respond to requests for help.
- Expanded coordination between help desk and other personnel will be required.
- Automated systems should be in place to track activity.
- New processes and procedures require definition, and then must be communicated to end-users.

The centralized help desk will be positioned to handle incoming calls and e-mails from all agencies. Some of these calls must be queued through a central service provider because this will be the only source of assistance available. These calls will include requests for help regarding enterprise functions (such as messaging) and also for those functions that are not readily supported by other agencies (such as report development). It should be recognized that some types of calls may be better resolved through resources other than the central help desk. Prime examples include minor software, desktop, or LAN support calls. While these types of calls will flow through a central point of contact, many of the calls will be quickly sent to local service technicians for resolution. Regardless of where service comes from, all calls will be recorded, tracked, and coordinated until the issue is resolved.

The reorganized help desk will reengineer how requests are handled and also the corresponding assignment of resources to address such requests. The components of this reorganization include the following:

a) *Customer Reporting Mechanism*

Customers require a mechanism to communicate needs, issues, and problems to help desk personnel. Customers will communicate via three ways: e-mail, telephone including voice mail, and help desk–reporting software.

b) *Technology Interface*

Once requests are sent, the help desk personnel will receive, record, and track information for follow-up purposes. If possible, requests for assistance will be handled on the spot. Otherwise requests will be assigned to another resource for resolution. An automated issue/problem tracking system will record, track, and prioritize issues along with assignments of resources. In the future it is possible that automated e-mail updates will be sent to the user as the process of resolution commences.

c) *Service Coordination*

Customers will have a wide variety of requests, ranging from fixing a problem with a software program to asking for one-on-one support. These requests will be handled either immediately by the help desk or sent to an appropriate resource for follow-up and resolution.

d) *Service Delivery*

Once requests are directed to a service group, they will be prioritized for resolution. Resources will be assigned based upon the scope of the project, timing, and complexity of the assignment. Service delivery will be provided through the various groups assigned to assist end-user customers. The anticipated sources of help include the management, computing, training, applications, Web, and infrastructure groups within central services. Additional help may also be sought from local network administrators and super-users located within the agencies.

The centralized help desk function is depicted in Exhibit 11.

Exhibit 11: Help Desk Service Delivery Model
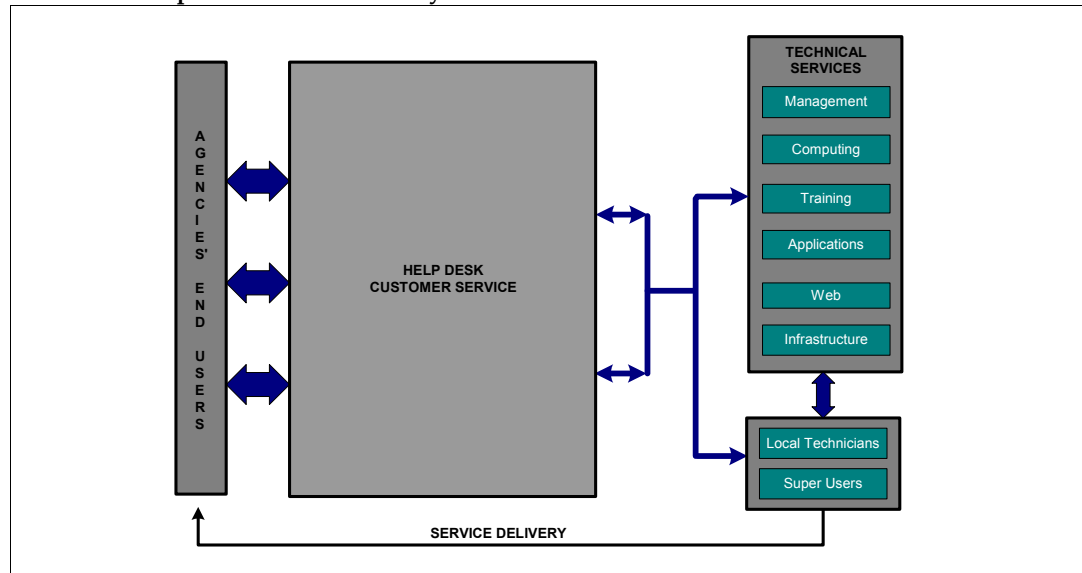
BUSINESS CASE

Many large organizations, including private industry, government, and nonprofit entities, have transitioned to centralized help desks in an effort to provide more efficient and cost-effective support. For example, the American Cancer Society worked to strategize, design, and roll out a solution for managing the organization's help desk and to streamline support procedures. According to Debbie Phillips, principal at The North Highland Co., the management and technology-consulting firm that assisted the American Cancer Society, "the project had to be viewed as evolutionary with a commitment to spend at least three to six months planning, building and implementing the strategy. Return on investment was realized six months into the process."[2]

Available industry statistics back the establishment and use of a centralized help desk function. According to Jeff Rumburg, Vice President of Meta Group:

- Calls resolved from the help desk, rather than at the user's desk, can reduce per-call costs by as much as 80 percent.
- Based on an organization with 3,000 employees and an average call volume of 5,000 calls per month, a decentralized help desk averaged $30 per call for a total of $150,000 per month. The same number of calls handled through a centralized help desk averaged $24 per call for a total of $120,000 per month, which is a noticeable difference.

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[2] Christy Walker, "The American Cancer Society Finds an IT Cure," Smart Reseller Magazine 2, no. 123 (October 11, 1999): 46.

The net benefits of establishing more centralized support, significantly done through the help desk, are anticipated to be positive. The cost/benefit analysis is a classic example of a case in which concentrated resources are expended to address thousands of support requests that eventually add up to significant aggregated benefits throughout the enterprise. However, with significantly increased customer service provided by the help desk, end-users will indeed operate more efficiently. The specific benefits of the reorganized help desk are numerous; responsiveness will increase, proper customer expectations will be set, needs will be prioritized and, ultimately, resources will be better utilized.

The costs involved in establishing a central help desk function are associated with staffing, procedures definition, communication, and infrastructure. Centralized systems will also be needed. It is not known at this time whether existing help desk systems operated within the County will be able to support the County far into the future. The plan behind a central help desk is to reorganize existing resources (particularly staffing). In addition to existing personnel, several new full-time equivalents (FTEs) may be needed. Management will come from existing resources.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Proactive Service Delivery • Service-Level Commitments • Help Desk Support • Agency Coordination	• Improve/Expand Services • Empower Employees • Improve Processes • Establish Communication and Collaboration • Define Metrics and Performance Measures	• There is limited reporting available to track and measure performance. • Help desk boundaries and responsibilities are loosely defined across the County. • The customization that has been done to HEAT impairs some functionality and impacts the upgrade process. • Because agencies have evolved independently, there is some overlap in services being provided.

Costs:				Payback:		
Low	Moderate	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Review existing County help desk platform(s)					▓	▓						
2. Determine capabilities					▓							
3. Develop implementation plan					▓							
4. Acquire new system capabilities (as required)						▓	▓					
5. Define Standard Operating Procedures (SOPs)						▓						
6. Hire staff (as required)						▓						
7. Train help desk personnel						▓						
8. Implement help desk technology						▓						
9. Coordinate with agency support resources						▓	▓					
10. Communicate new process to end users								▓	▓			
11. Implement new coordinated systems									▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:		107,500	
Operations:		304,500	244,500
Total:		412,000	244,500

Capital Costs: Year two.
Operations Costs: Continue indefinitely with new staff.

OUTCOME MEASUREMENT

- Number of calls handled
- Percent of questions answered on first call
- Response times
- User satisfaction (measured through surveys)
- Help desk costs

A3. Utilize the State of Washington's Digital Academy to promote learning.

The concept behind the State's Digital Academy is to "learn while doing." This concept combines two elements. The first is to establish an environment where people come together to learn about Web-based technologies. The second is to gain knowledge through real-time activities associated with building e-government

Timing: PHASE ONE	Difficulty: LOW
– Time must be freed up from day-to-day operations to participate. – Targeted participation must occur through identification of those personnel who will maximize the opportunity, and bring back and apply such knowledge.	

applications. The approach brings both end-users and technical personnel together to generate ideas, establish needed processes and requirements, and eventually define an approach and design for specific application deployment. To date, the Academy has run three series of sessions, one each for permitting, e-forms, and licensing. A fourth session is being discussed and may pertain to content management. Each of these application areas is potentially valuable to the County.

The State has offered the Digital Academy to the County at three levels, including (1) participation in regularly scheduled sessions, (2) attending courses that cover past topics, and (3) conducting new courses that move the previously developed Web applications to the "next level" of functionality.

BUSINESS CASE

The direct benefits of participating at the Digital Academy directly tie to the underlying concept of learning while doing. This strategy directly supports the County's e-government initiative by increasing Web-based knowledge within the organization, helping establish standards for development, and setting the stage for cost-effective fast-track development. Essentially, participating personnel are able to accomplish two things at the same time. Attendees are able to gain state-of-the-art know-how while at the same time jump-starting the implementation of needed applications. When considering that personnel bring home the expertise to develop needed applications, the Digital Academy effectively provides a development blueprint to follow, possibly reducing the time and expense required in the development process. Through participation in Academy sessions, requirements are defined, and development approach and design established. This classroom knowledge may be brought home immediately. Further, there is a likely added benefit to the County of helping to establish technology standards.

The costs of participation are moderate. There is a modest registration fee involved (likely for each County agency). The entry fee is assumed to be the same whether one or several people attend the sessions. The larger cost involved is associated with time commitments, as each course spans a 13-week period (one day per week). When multiple personnel are participating, the time will add up. It is assumed that multiple agencies' personnel would attend together. The out-of-pocket costs are considered competitive in comparison to other training of the same caliber.

When benefits are compared to costs, the payback is potentially significant. While each session/application requires separate evaluation, it is conceivable that the Academy will save the County thousands of dollars for each application needed. This premise is based upon an average of hundreds of development hours not required. The risks of development are also assumed to be reduced as the probability of successful application deployment is increased.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• End-User Training • Technician Training • Agency Coordination	• Improve/Expand Services • Empower Employees • Establish Communication and Collaboration • Enhance Skills	• There is limited cross-training between agencies. • Training is managed tactically versus strategically.

Costs:				Payback:		
Low	Moderate	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Assign coordinator(s)	▓											
2. Evaluate past and future Academy topics	▓											
3. Compare County needs and determine value of each session	▓											
4. Coordinate with State Academy	▓	▓										
5. Target personnel participation	▓	▓										
6. Schedule and attend		▓	▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	72,500	72,500	72,500
Total:	72,500	72,500	72,500

Capital Costs: N/A.
Operations Costs: Continues indefinitely.

OUTCOME MEASUREMENT

- Number of staff participating
- Increase in skills (tested/surveyed)
- Resulting applications developed
- Number of applications utilized by end-users
- Time required for developing/implementing new systems
- Standardization across systems

A4. Use the Internet as a primary mechanism to deliver public information and services.

King County has embraced digital government with the ultimate goal of delivering improved service to the public. This initiative is based upon a vision of employing new business models, new methods of communications, and new technologies. The result will be increased service provided to the public through empowered employees supported with the best technical resources.

Timing: PHASE TWO	Difficulty: MODERATE
– Requires new internal skills for development and/or hiring of external help.	
– New business model to County, not widely understood — impacting ability to deliver and requiring revision of business processes.	
– Lack of track record and management capabilities to oversee such work.	
– Requires significant time.	
– Delivery of applications will add up in terms of cost.	

This strategy is specifically designed to use the Internet to address government-to-citizen (G2C) services while issues related to using the same technology to enhance connectivity with employees and external business partners are addressed below in the section that outlines an intranet and extranet strategy. G2C is accomplished by providing information pages and e-services directly to the general public. The manner in which the public will be served will evolve over time as the County's technical capabilities mature. The next generation of County G2C services is evolving on a natural path by conducting business along four stages of change: establishing a presence on the Internet, interaction between parties, transacting business, and transformation. These County phases are in direct alignment with those

described in Gartner's E-Business Model. The County's evolution is being staged through the following:

1. "Presence"—primarily being one-directional and providing relatively static content
2. "Interaction" between parties—involving two-way exchanges of information
3. "Transacting"—providing two-way e-services through specific business transactions
4. "Transformation"—conducting e-services through automated business collaboration and realigned business processes

The County is in the early stages of a natural migration to e-government. Currently, the County is primarily between stages one and two. It will be important to establish more structure in order for the County to successfully evolve further into stage three. The County is not yet contemplating a move into the transformation stage.

The focal point of the County's Internet efforts is the County's Web site. This mechanism is a rich source of information for the residents of King County as well as the public at large. The public Internet site presents a broad array of information about the County, its government, and current news relating to the activities and services. The site provides basic answers to the questions of —

- *What* agencies exist and what services are provided?
- *Who* should be contacted for additional information?
- *Where* should one go to acquire services?
- *How* does one get there?

There are literally thousands of pages of information regarding the County's various agencies, departments, divisions, sections, offices, and the services provided. Table 25 summarizes the types of information and services provided on the County's site.

Table 25: Internet Site

Information/Services
Information about the County, its governmental agencies, and the services provided
News relating to County government, projects, improvements, events, etc.
Service and subject indices containing links to pages that are part of the County's site
Links to non-County pages, resources, and services
Forms, documents, and reports to download or print
Ability to send comments or suggestions to agencies
Special sites for weather and other emergencies
Ability to register for e-mail notification of specific types of events (e.g., road closures)
Query facilities to several special purpose databases including property tax look-up
Several GIS-based applications
Public testimony recorded
Bus passes, birth and death records, and vehicle license tab renewals available through electronic purchase

Currently, the County Web site is rather limited with respect to the complete range of functions that are possible. In general, the County Web site is information rich, but very limited with respect to services. There are, however, notable exceptions to this assessment. The following are examples of existing Web-based information services that are relatively sophisticated in design and function: GIS's Imap, DDES's parcel locator, Metro's Trip Planner, MYCOMMUTE, streaming audio/video of Council meetings, and the County online directory.

The County has a significant opportunity to transform its Internet site from a relatively static site to one that is more interactive and conducts more business over the Internet. When the move is made to be more interactive, the value of the site to the public will increase. Examples of activities that may be automated include scheduling a picnic site or signing up for a class or to attend a meeting. Examples of basic financial transactions that may be placed online include paying for property taxes and traffic tickets, or buying a pet license. This move to two-way activity is illustrated in Exhibit 12.

Exhibit 12: Internet Activity
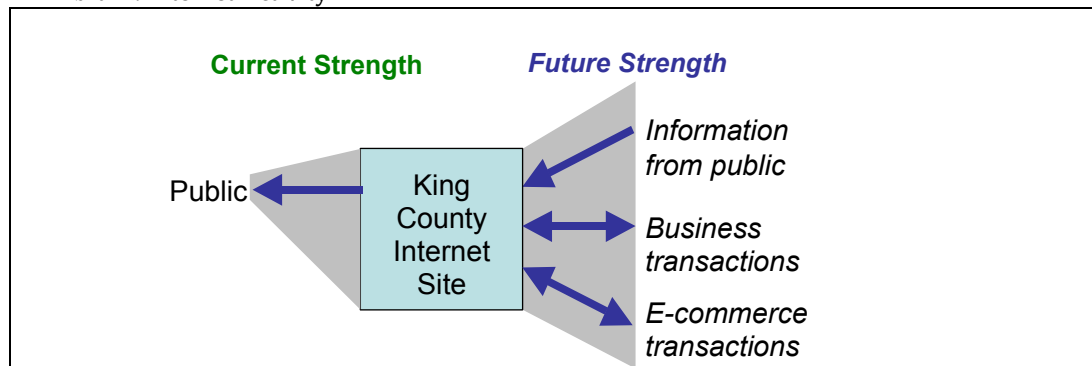
While recognizing the four stages in Gartner's e-business model, numerous specific target areas have been defined for the County to consider in its development efforts, including: Presence — enhanced information dissemination; Interaction — online information submission; Transacting business — online request-response (nonfinancial) transactions and e-commerce (online transactions including a financial component). The four target areas have been identified through a review of what peer organizations are doing, consultant ideas, and agency input. Each of these areas is discussed further below.

a) *Presence — Enhanced Information Dissemination*

A significant amount of staff time across the County is spent responding to requests from the public for information. Most often these requests come in the form of telephone calls. There are many instances in which providing Internet access to information already available in a database would improve service to the public and reduce cost. This means that the Web site could substitute for the more costly resource of a person answering the phone. One example is at the Department of Development and Environmental Services, which recently completed an application that makes building permit status information available online. DDES anticipates that this will result in a significant reduction in the number of phone inquiries that are handled by staff on a daily basis. Another example of an existing application of

this type is the Sheriff Office's Sex Offender Database that supports queries by last name and zip code.

Table 26 presents candidate **new** applications for *information dissemination* via the Internet.

Table 26: New Applications – Information Dissemination

Agency	Application
Adult and Juvenile Detention	• Subjects in custody — information about charges, cause number, bail, court date • Inmate information — information for inmates and families
Courts	• District Court calendar (dynamically updated) • Superior Court calendar
Elections	• Voter information by address/zip code
Emergency Management	• Access to online reports and archived reports
Judicial Administration	• "Point of Entry" information for the public — a searchable database containing answers to the most frequently asked questions concerning King County's judicial system
Prosecuting Attorney's Office	• Posting of daily advisories • Sentences — information about sentence handed down (updated on a weekly basis)
Public Health	• Online searchable catalog of information resources available
Solid Waste Division	• Reuse/recycler information
Sheriff Office	• Crime frequencies by area with map display • Sex offender map display • Outstanding arrest warrants • Deadbeat parent database • Nonemergency incident reporting

Table 27 presents candidate **upgrades** to existing *information dissemination* applications.

Table 27: Upgraded Applications – Information Dissemination

Agency	Application
Budget Office	• Publishing of proposed County budget in fall • Publishing of approved County budget in late winter
Elections	• Online voters pamphlets (improvement)

b) *Interaction — Online information submission*

Collecting information via the Internet is another prime area for Web automation at the County. In general, very little information is received by the County from the public via the Internet. Currently, visitors to the site have ample opportunities to send comments or requests via e-mail to agency Webmasters or other individuals who are named on the various agency pages. However, much more could be done to make the Web site a more valuable and convenient vehicle for the public to send information of a more specific nature to various agencies and divisions. Several primary advantages of utilizing the Internet to collect information include information collected in a machine-readable format eliminating the need for manual

data entry; applications improving the accuracy and completeness of the information supplied; an automated response indicating receipts generated, a formal record of public correspondence, and measurement of the County's customer service. The following list provides several examples of how a relatively simple Web form could be used to collect information that is potentially valuable to the County.

Table 28 presents candidate **new** applications for *online information submission* via the Internet.

Table 28: New Applications – Online Information Submission

Agency	Application
Countywide	• Information surveys and/or polls
DOT — Roads	• Problem reporting (e.g., potholes) • Requests for road maintenance or improvement
Licensing and Regulatory Services Division	• Lobbyist registration
Finance	• Online submission of responses to RFP/RFQ/RFI requests

c) *Transaction — Online requests with response (nonfinancial) transactions*

For some nonfinancial business transactions it is feasible to include an immediate online response to a request submitted via the Internet. This is true of database queries, but this category of application includes more than simple database query processing. This type of transaction requires not only the retrieval of information in a database, but the examination of the data received (perhaps through a comparison with data previously recorded), evaluation of applicable business rules, and recording of new information including the result (success or failure) of the request. As an example, consider an online application to schedule meeting rooms that may be reserved for public use. Responses may include the following: "Your reservation has been accepted," "You already have a room reserved for that time," or perhaps a list of alternative rooms, if the one requested is unavailable. Generic examples of transactions of this type that do not require payment of fees include submission of a simple application, scheduling of meeting(s), submitting information to an online directory, and reserving a facility.

Table 29 presents, within the County, **new** applications for *online request — response (no-financial) transactions.*

Table 29: New Applications – Online Request with Response

Agency	Application

Courts	• Jury Duty Summons
	  o Request for rescheduling
	  o Request for deferral

Countywide	• Request to schedule meeting rooms

Sheriff Office	• Online reporting of
	  o Suspicious activities/persons
	  o Crimes
	• Responses to requests for information

d) Transaction— E-commerce (online transactions including a financial component)

An e-commerce application is similar to those described in the above category, as it includes use of business rules and recording of information in a database. In addition, it will include one or more financial transactions, such as authorizing an amount to a credit card account, debiting a credit card account, crediting a credit card account, and using other payment methods such as Internet checks. Automating these types of processes will force changes in the way the County conducts business. Within the County, at the time of this plan, there are two e-commerce applications accessible via the Internet site. It should be noted, however, that both of these applications are hosted by an independent service provider. The three existing e-commerce applications include the online purchase of Metro bus passes, online order of vital records — services provided by VitalChek, and the State's online renewals for vehicle registration.

Additional, other candidate **new** applications for *e-commerce – online transactions* are presented in Table 30.

Table 30: New Applications – E-Commerce Online Transaction

Agency	Application
Department of Transportation	• Fleet Store[3] • Map Counter
Parks Division	• Online ticket sales to special events • Event and facility scheduling/reservations
Sheriff Office	• Sale of patches and other items
Finance	• Property taxes
DNR	• Wastewater capacity change
DDES	• Permits • Business licenses
District Court	• Fines • Small claims filings
Licensing	• Pet licenses
Superior Court	• Filing fees

It should be noted that the County is evolving through the first three stages of Internet revolution. The fourth stage of transformation has not yet been planned.

BUSINESS CASE

The slow transition from paper-based systems and face-to-face servicing is burdening the County with obsolete ways of providing information and services to the public. The benefits of using the Internet as a mechanism to increase and improve the public interface may be grouped in three categories: financial, service, and efficiency. Internet opportunities should be scrutinizing on a case-by-case basis. Within this business case, numerous representative examples are identified. While all are being pursued, realized benefits have yet to be documented.

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[3] Fleet Store = Public Transportation Store

The use of the Internet has the direct potential to produce cost-savings and cost-avoidance benefits. The first benefit category requiring recognition is financial. Simply put, Internet-based communications and services with the public are considerably less expensive for the County to conduct, not only because of the added staffing efficiency of Web-based transactions, but also because of the reduction of overhead necessary to support manual processes. The comparative costs of doing business either by phone or written form are substantially higher than Web-based interaction, as noted in the research conducted by the City of Sunnyvale (CA) in Table 31:[4]

Table 31: Comparative Costs of Internal Processing

Cost of Individual Payment Transaction	
U.S. Mail	$ .73
Telephone	.54
Internet	.01[5]

Sunnyvale is not alone in recognizing the potential savings of such ventures. For example, several counties in New York have recently adopted an automated hunting license program with a Web front end from which the counties expect to save $250,000 per year starting in the first year, up to a maximum of $1 million per year by the fourth year. The point here is that counties are experiencing direct cost reductions in their business models, in this case through streamlined license-renewal processes. The savings have come directly in the form of reduced paperwork, decreased staff hours, and less costly premiums. Moreover, the retention of licensees means that more people are apt to participate in the program instead of becoming disconnected from the regulatory process.

Cost alone is certainly not the only measure of the County's fulfillment of its mission. A more actualized Internet presence will also enable the organization to serve the public in a more responsive and effective manner. The ability for a resident to pay taxes, securely access records, submit forms and license renewals, and be continually updated on County functions leads to a more healthy governmental and public policy environment. A citizenry that is engaged with its governing body is more likely to support it when the County is providing efficient service including that provided on the Internet.

While many in the public will not be quick to recognize "behind the scenes" cost savings of Internet-based automation, they will acknowledge the added efficiency and information sharing of an improved Internet presence because this capability has a clear impact on County public services. One of the more notable success stories in this area comes from New Mexico's Department of Human Services, where an online child support database was implemented that allowed single parents instant Web-based access to determine the status of child support payments. Whereas this information used to be available only after spending inordinate amounts of time in phone queues or by mail, the new online "service provides real-time information on payments and allows custodial parents to set up direct deposit of checks into their banking accounts. Parents in the program also manage their cases online, check for news updates, such as the

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[4] City of Sunnyvale Information Technology Strategic Plan, January 1999

[5] Staffing support related to internal processing.

establishment of paternity, and may even modify a support order."[6] While the program has considerably reduced costs (because of decreased staffing and higher levels of efficiency), the most palpable benefits have been the added service for those in need.

It may be concluded that the greatest savings available is through the increase in efficiency. The labor-intensive routines of data entry, mailings, and processing paperwork are greatly reduced. A representative example of such gains is found in the State of Arizona, which is in the process of implementing online bid solicitation that considerably reduces the workload required to sift through solicited proposals. The reduced overhead of "the proposed electronic contracting system will not only automate some of the labor-intensive steps, but will also reengineer and streamline operations, making the process more efficient and cost-effective. In addition to centrally managing the State's bids process, the electronic contracting system will significantly reduce the lag time in proposal evaluation. More importantly, it will free up staff time to focus on bid analysis and negotiations."[7]

The purpose of the above illustrations is to identify the significant differences in the cost, service, and efficiency factors of handling data in electronic form. While this strategy avails itself to new technology, the costs associated with building this infrastructure are more conventional. Capital costs include those related to procuring equipment and software, and building Web site capabilities. Operating costs include the costs of maintaining the sites and processing ongoing transactions. Because systems provide a substitute for daily interfaces with dozens of personnel, the benefits of lower ongoing labor costs far outweigh the costs involved with development and ongoing maintenance functions. It may be concluded that the net benefit of moving to the Internet as a primary mechanism to deliver public information and services is positive. Overall, as with other systems targeted for implementation, each application should undergo detailed cost/benefit analysis prior to development.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Proactive Service Delivery • Planning and Design • Internet/Intranet Access	• Improve/Expand Services • Empower Employees • Manage Data and Information • Ensure Greater Public Awareness • Demand for Increased Public Information	• Current emphasis is mostly limited to static "public information" rather than interactive "public services." • The County is behind some of its peers in implementing and realizing the benefits of e-commerce.

Costs:				Payback:		
Low	**Moderate**	High		Low	**Moderate**	High

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[6] http://www.govtech.net/magazine/story.phtml?id=3030000000004282.0

[7] http://www.govtech.net/magazine/story.phtml?id=3030000000004274.0

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define potential applications for development					■							
2. Select technology (in alignment with standards)					■							
3. Conduct cost/benefit analysis					■	■						
4. Obtain approval and funding					■	■						
5. Assign developers					■	■						
6. Develop specifications, design application					■	■						
7. Gain approval							■					
8. Develop							■	■				
9. Define business processes							■	■				
10. Document requirements and design							■	■				
11. Test							■	■				
12. Document							■	■				
13. Train									■		■	
14. Implement										■	■	■

Costs	Year 1	Year 2	Year 3
Capital:		260,000	260,000
Operations:		430,000	428,000
Total:		690,000	688,000

Does not include complex development and integration.

Capital Costs: Continue annually indefinitely.

Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Number of applications successfully operating on Web
- Number of improved business processes
- Level of utilization by the public (as measured by "hits" and numbers of transactions)

A5. Promote and support the development of the employee intranet and partner extranet to improve information services and business process support.

Besides public access to the County through the Internet, the County is positioned to conduct business with three other groups of constituents over its network: employees, businesses, and other governments. This strategy is set to expand on e-government by connecting —

Timing: PHASE TWO	Difficulty: MODERATE
– Requires expanded skills and resources. – Evolving business model in which employees and business partners must learn and adapt to use new automated mechanisms.	

- Government-to-Employee (G2E) — over the County's intranet through the collection of internally accessible information pages and Web-enabled services made available to employees in the execution of day-to-day business processes;

- Government-to-Business (G2B) — over an extranet through the collection of limited access information pages and Web-enabled services made available to specific business partners of the County;

- Government-to-Government (G2G) — over an extranet in the same manner as businesses, with government entities at all levels that are collaborating with the County.

Both the County's intranet and extranet are considered fundamental to increasing use of the Web. Because of the direct business benefits available, the County should consciously shift its development orientation to the net when it is cost-effective to do so. In this regard, executive management should strategically define the intranet/extranet to be key components of the County's technology navigation and define and support integration of these technologies into the County's planned architecture.

The intranet is the primary resource connecting employees to functions on the LAN or the WAN. Simply put, the County intranet is the set of information pages and Web-enabled, browser-based applications used by employees to conduct daily business. Likewise, for business partners, the extranet is a secure, limited access Web resource (information- and browser-based applications) maintained by the County to connect with authorized business partners and other governments. The extranet may be used to conduct business with special constituencies external to the County, including other governmental agencies, nonprofit business partners, educational and research institutions, and commercial product and service providers. In the past, this has been done by allowing partners secured access to the enterprise WAN. At present, most sharing and collaboration is supported through secured Internet connections. However, many cost-effective extranet opportunities exist to conduct collaborative business. Both the intranet and extranet(s) may be part of the same business solution and built from the same common technologies.

Based upon the interviews conducted as part of this study, there is a significant amount of planning underway as well as current development to "Web enable" many internal applications that are used by County employees for conducting day-to-day business. A twofold shift is occurring to develop browser-based applications as well as to convert ("Web enable") and/or add new browser-based interfaces to existing internal County applications. The reason for this shift is very practical. In general, browser-based applications provide easier access, a consistent look and feel, and typically reduce the efforts and costs associated with desktop support. The County can make good use of a revamped intranet by borrowing ideas from other public and private sector entities. Potential applications are listed in Table 32:

Table 32: Potential Intranet Applications

• Online posting of County regulations • Web-based technical and application training • Performance data • Facilities list – (rooms, addresses, etc.) • Organizational charts • Help desk interface • Customer relations management notes and tools • Online posting of standard operating procedures	• Vendor contact information • Online HR information (self service) • Conference room sign-up • Pool-vehicle reservations • Online collaboration tools (chats, newsgroups) • Office supply ordering • Project tracking using MS Project or other tools

The extranet may also be used effectively through sharing data with external parties such a business partners and other governmental entities and associations. Examples in the field of this type of usage are listed in Table 33

Table 33: Potential Extranet Applications

• Project management tools for collaborating third parties • Sharing ideas and documents with a select group such as other governments • Online training by vendors • A way of using high volumes of data using Electronic Data Interchange (EDI) • Collaborating with external companies on joint development and programming efforts • Sharing news of common interest exclusively with partner governments • Data collection for polling • Shared databases with vendors • Supply chain connectivity (order entry, reporting, inventory) • Billing

Clearly, there is much the County can do to utilize the cost-effective Web-based platform for increasing information sharing with both employees and external partners. These relatively low-maintenance applications will serve both the organization and its group of constituents well.

BUSINESS CASE

For the same general reasons that the Internet will better serve the public, the intranet and extranet will better connect and serve both employees and the County's business partners. That is, technologies may be used to increase access to information and strengthen connectivity, while also allowing the County to be more cost-effective in the delivery process. The relevant business premise is that the net, once built, will significantly reduce the amount of labor necessary to conduct business and to maintain systems.

Examples of cost savings through the use of secured and robust extranets abound. The Government of Alberta has recently implemented an online browser-based "e-billing" solution to handle invoices from vendors. Operating costs have been significantly reduced because the bulk of invoice processing is now automated. In the words of Stan

Hayter, Assistant Deputy Minister, "Since installing [the] 100 percent Web-based solution to completely automate our invoice management, we are expecting to save more than $500,000 (Canadian) in our first year." He adds, "And the solution also saves our suppliers' time and money. In fact, one supplier will be saving over $100,000 in postage and handing costs alone by sending in bills electronically. As we add more suppliers to the application, others are approaching us to get online."[8]

Web-based extranet interfaces are paying for themselves in reasonable time frames, generally recouping their extranet investments in two to three years.[9] While examination of such applications is still required on a case-by-case basis, especially considering levels of utilization and corresponding time savings, it is known that companies forging extranet bonds with distributors spend less time dealing with account questions, processing orders, managing paperwork, and disseminating information to partners.

Intranets are also both time- and dollar-saving endeavors. For example, industry "analysts estimate that 18% of corporate printed material becomes outdated within 30 days. Documents that are printed and mailed, such as internal phone books, policy and training manuals, requisition forms and marketing materials, can be put on an internal web server and updated for a fraction of the cost of printed material. It is not only the publishing but the updating of information that leads to savings."[10] The use of an intranet for internal information sharing, particularly in areas where the data is continually updated and having to be republished, has the capacity to save considerable resources for the County through reduced printing and distribution costs.

The ability for employees to quickly get the information needed will also benefit the County. Quick access to even simple items such as online benefits forms and information directories often saves the time that would be otherwise required for a phone call or visit to the agency HR Coordinator. As the availability of information becomes increasingly work specific and directly applies to a person's job function, rapid information retrieval from an online source will further increase savings. One organization that is experiencing a positive return on investment is the SAAB Corporation, which recently moved to an intranet for key customer support positions. The corporation expects a positive return on investment in only two years' time.[11]

Finally, Web-based intra- and extranets also allow for 24x7 productivity in the workplace, providing opportunities to make use of the hours before and following the typical workday. Organizations that allow for productivity during these "off hours" allow for both flexibility in the workplace as well as a more highly effective workday. Similar to what was noted in the earlier strategy related to the County's use of the Web for enhanced and efficient contact with the public, the benefits and cost savings of using intranets and extranets for contact with employees and business partners are significant. The return on investment in this area will greatly benefit the County.

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[8] http://www.Microsoft.com/business/casestudies/upside_Alberta.asp

[9] http://www.cio.com/archive/webbusiness/020499_extranet.html

[10] http://www.intrack.com/intranet/ireturn.shtml

[11] http://www2.software.ibm.com/casestudies/swcs.nsf/customername/CB02138FB46FD8FD8725699B002C15B7

Related Technology Needs:
- Planning and Design
- Internet/intranet Access
- Agency Coordination

Related Business Goals/Objectives/Directions/Opportunities:
- Improve/Expand Services
- Optimize Analysis, Assessment, and Improvement Practices
- Establish Communication and Collaboration

Related Deficiencies:
- The County is behind some of its peers in implementing and realizing the benefits of e-commerce.
- The County intranet is a rapidly expanding in a relatively unmanaged manner.
- Little work has been done on the extranet with respect to infrastructure development.

Costs:

Low	Moderate	High

Payback:

Low	Moderate	High

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Acquire development tools					X							
2. Develop/agree on standards					X	X						
3. Determine/assign development responsibilities					X	X						
4. Hire staff (as required)					X							
5. Define potential applications (for development)					X							
6. Select and agree on applications, prioritize based upon cost/benefit					X							
7. Design specifications							X	X				
8. Design application							X	X				
9. Gain approval								X				
10. Develop applications								X	X			
11. Test									X			
12. Document									X			
13. Train									X			
14. Implement										X	X	X

Costs	Year 1	Year 2	Year 3
Capital:		415,000	415,000
Operations:		424,000	440,000
Total:		839,000	855,000

Capital Costs: Associated with hardware, software, and development with $240K continuing annually indefinitely.
Operations Costs: Continuing annually indefinitely.

OUTCOME MEASUREMENT

- Successfully deployed applications and connections
- Level of utilization by employees and business partners
- Amount of time saving/cost reduction through increased and more timely information access and processing of business applications

B. *Operations*

Four operations strategies have been developed for consideration. Subject areas are the following: asset management, standard operating procedures, system security, and business continuity. Related to strategy development, operations weaknesses of particular concern include the following:

- A lack of comprehensive asset management whereby assets are managed on an enterprise level rather than reactively within agencies.
- Other than for the mainframe, few standard operating procedures are defined to guide those responsible for performing similar duties across the County.
- A high level of vulnerability in the area of technology security related to internal and external threats.
- A serious lack of business continuity planning, which will limit the County's ability to recover in the event that technology fails for an extended period of time.

B1. Establish a comprehensive asset management function.

The County's current approach to asset management is piecemeal. Most managers believe that current inventory activities and tracking of assets suffice as asset management. Although inventory and tracking activities are vital, the functions are only the beginning of what asset management is about.

Timing: **PHASE ONE**	Difficulty: **MODERATE**
– Ongoing funding will be significant at times.	
– Must hire a trained asset manager.	
– Automated systems are required to adequately track assets.	
– Requires ongoing analysis, and alignment of procurement, maintenance, and disposition activities.	
– Personnel from all agencies must coordinate efforts.	

The heart of asset management is determining the proper balance of procurement, repair, preventative maintenance, upgrade, and replacement activities. While saving money is a primary goal of asset management, another is to provide an asset base that supports agency personnel. To this end, very little asset management is occurring presently. A key indicator is the fact that planned multiyear maintenance, upgrade, and replacement schedules largely do not exist. What schedules are in place are not typically based upon analysis that defines the optimum points of maintenance and asset replacement.

In the field of asset management, the County requires a trained resource manager. This individual will conduct analysis related to determining the condition of assets, and more importantly, how assets will be maintained. An integral core of asset management is an automated asset management system. These powerful computer systems help asset managers make sound decisions through optimization tracking applied to the pool of assets. Because asset condition directly impacts the ability to maintain particular service levels, asset management is deemed critical to the overall technology program and managing the total cost of ownership. Asset management will directly impact the County's plans for replacement, vendor relations and contract terms, system life spans, contents of service-level agreements, and the ability to budget at an enterprise level.

Perhaps the most visible example of where asset management is needed is in the area of PC replacement. The County has been examining the issue of establishing a structured program for a number of years. Both the 1999 and 2000 County technology plans reference the need for such a program. A PC replacement program would establish a comprehensive program to optimize equipment lifespan of the County's 10,000 workstations. A formal asset management function will examine all computing assets and determine a replacement schedule aligned with a proper budget. In the case of desktops, the program would confirm whether an optimal time for replacement should be at the four- or five-year point, following industry standards.

Through effective asset management, the County can also make cost/benefit decisions regarding the replacement or upgrade of systems by analyzing the total cost of ownership. To accomplish this, the County will need to do the following:

- Maintain an up-to-date inventory.
- Coordinate replacement with software deployment.
- Direct replacement of a percentage of units annually.
- Negotiate master contracts to achieve economies of scale.

Clearly, the benefits of a well-organized and formal asset management function will lead to increased savings for the County. Replacement of the current piecemeal approach with a deliberate and effective management process will cost effectively balance and track all aspects of lifecycles, leading to quantitative savings.

BUSINESS CASE

When properly implemented, a centralized asset management system constantly provides information that empowers management to make both tactical and strategic decisions about the enterprise. The benefits of supporting comprehensive implementation are numerous and the costs are modest. Specific benefits include the ability to do the following:

- Identify and remove dormant assets.
- Prevent unnecessary purchases.
- Perform improved procurement analysis.
- Perform faster and more accurate budgeting and forecasting activities.
- Identify vendor accounting errors and manage cash flow through invoice validation.
- Prevent duplicative enterprise assets.
- Enforce service-level commitments.
- Strengthen the negotiations position with vendors.
- Avoid noncompliance penalties (including licensing).
- Provide improved issue management via the help desk.
- Empower change management.[12]

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[12] "Asset Management: Formalizing a Process for Technology Investments," White Paper [electronic document], Copyright 2001, Predictive Systems Available at http://www.predictive.com/resources/papers.cfm

In addition to these benefits the Gartner Group estimates that "'every organization can realize cost savings of between 2% and 7%' by getting serious about asset management."[13] Furthermore, the Meta Group reports, "By enabling companies to gain efficiency through better control of their technology, asset management tools lead to bottom line results."[14] This asset management strategy specifically addresses one of the four deficiencies related to King County identified in Governing.com's Government Performance Project 2001, related to establishing an IT replacement policy.

One example in which an organization implemented comprehensive asset management and achieved significant results is the Los Angeles County–USC Medical Center. The medical center implemented a materials management system, which saved $1.5 million in the first year and an anticipated $600,000 for each following year.[15] One important aspect of this system included improved technology management.

While the Gartner Group reports that asset management for technology continues to be done informally at many organizations, Predictive Systems, a leading technology and infrastructure consulting company, estimates that by 2003 an estimated 60% of IS organizations will, or plan to, implement formalized asset management processes to improve IT cost effectiveness and control. It is clear that asset management will benefit the County by aggregating all significant technology resources under one managed program.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Service Level Commitments • Neglected Technology Management Functions • Planning and Design	• Utilize Cost-Reducing Technologies • Efficient/Effective Use of Technology	• There is no Countywide asset management program in place. • There is no "one central source" for conducting asset management and no standard practice for depreciating equipment. • There is a lack of understanding of the basic purpose of such a program, that being to optimize assets' useful life.

Costs:		
Low	**Moderate**	High

Payback:		
Low	Moderate	**High**

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[13] "Asset Management: The Elusive Search for the Holy Grail," White Paper [electronic document]. Janus Technologies, Inc. and Tangram Enterprise Solutions, Available at http://www.janus-tech.com/Asset_Mgmt/Tangram.html

[14] Gale Group, Inc. and 101 Communications, Inc., "Trim the IT Budget," *Enterprise Systems Journal.* 16 (No. 10, 2001): 60.

[15] "Inventory and Materials Management," (January 6, 1982) [electronic document]. Los Angeles County Citizens Economy and Efficiency Commission, Available at http://eec.co.la.ca.us/pubfiles/realasst/pubframe.htm

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Hire an asset manager	■	■	■									
2. Complete/Maintain a centralized inventory of assets	■	■	■									
3. Assess asset condition.		■	■	■								
4. Define hardware/software standards (annually when required)			■									
5. Establish vendor relationships/negotiate master contracts			■									
6. Define requirements/acquire and implement systems			■		■	■						
7. Establish/maintain enterprisewide licensing program (with software)			■		■	■						
8. Develop a plan with schedules for maintenance, upgrades, and replacement by agency (and update annually)			■	■	■	■						
9. Conduct centralized asset management			■	■	■	■	■	■	■	■	■	■

Costs	Year 1	Year 2	Year 3
Capital:	500,000		
Operations:	100,000	160,000	160,000
Total:	600,000	160,000	160,000

Capital Costs: Associated with establishing function.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Plan established and updated annually
- Asset management system procured and utilized
- Inventory tracked in one central location
- Maintenance schedules produced (where relevant)
- Optimized asset life spans supported by cost/benefit metrics
- Total cost of ownership known, tracked, and managed

B2. Develop standard operating procedures to guide all agencies' technology staff.

Standard operating procedures (SOPs) are published common tasks to be followed in a uniform manner and adhered to by those who perform the same or similar duties. In short, organizations use SOPs to "document what they do and do what they document."

Timing: PHASE ONE	Difficulty: LOW-MODERATE

– Takes time to assess and document detail involved.

– Requires agreement among technical staff.

– Must assign responsibilities (ownership) to track ongoing changes and maintain documentation.

The requirements for effective SOPs are threefold. First, they must clearly communicate how a particular function is to be performed in a step-by-step manner. Second, they must be continually updated and communicated to staff as requirements and methods change. Third, there must be management over SOP utilization to ensure that the steps are closely and regularly followed. Successful implementation of an SOP program cannot overlook any of these components because each is critical to success.

Design and implementation of the SOPs requires collaboration. SOPs should be developed by teams, wherein staff familiar with specific procedures are utilized in the development process. This collaboration will increase the likelihood of future utilization by making use of resident knowledge and through buy-in from those who will be following the procedures on a regular basis.

SOPs can be integrated into many aspects of the technology environment, particularly those areas that contain routine and consistent maintenance requirements. Examples especially relevant to the County include desktop image preparation, remote access configuration and setups, printer diagnostics and maintenance, and help desk guidelines for troubleshooting and resolving network connectivity issues. SOPs are ideal for relatively simple procedures that require consistency in execution and delivery.

The development and maintenance of the SOPs should be distributed across the County with the results being shared among agencies, perhaps through the intranet. With this model, SOPs may be defined both within particular agencies and between agencies extending to the enterprise level. The sharing of SOPs will also help a more centralized County IT department to monitor the quality of work in the distributed areas.

BUSINESS CASE

Standard operating procedures serve to ensure consistency and uniformity across an organization. Standard operating practices will help accomplish the following:

- *Ensure that operations are performed consistently to maintain quality control of processes and services*. Consistent technology performance and support across the County is an important goal that keeps some agencies from experiencing difficulty with inadequate support timelines and procedures. The SOPs will provide best practices checklists for ensuring consistent and adequate support, thereby allowing the County to more accurately monitor support in all areas of the organization.

- *Confirm that approved procedures are followed in compliance with County and other government guidelines.* Greater governance over technology support will allow the County to better monitor adherence to set policies and service-level agreements.

- *Serve as a training document for teaching new staff.* SOPs often serve as highly efficient ways of helping technology staff "get up to speed" when newly hired or when accepting new responsibilities. Measures gained here are improved efficiency of technology staff, decreased training costs, and greater flexibility in cross-training and resource pooling.

- *Provide a checklist for quality control and the reduction of errors.* Error reduction reduces staff resourcing needs and increases productivity because known problems are fixed quickly and with less staff time. The SOP checklist encourages the task to be successfully completed in a set period of time.

- *Stand as a historical record for revising process steps if changes are needed.* The County will be able to rapidly produce and update set procedures for quality monitoring and historical reporting, eliminating the need for inefficient "bursts" of technical writing when such information is required.

A set of well-conceived, well-written procedures can be an efficient set of tools for ensuring organizational efficiency and productivity.[16] Clearly, these benefits will have a long-term impact on County technology spending through the greater levels of efficiency, staff productivity, and production quality. The costs involved in development primarily will consume personnel time. Because this effort may be absorbed into the daily workload, there is potential for holding hard dollar cash outlays to a minimum.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Standards • Documentation of Existing Applications • Law, Safety, and Justice • Help Desk Support	• Optimize Analysis, Assessment, and Improvement Practices • Increase Revenues and Control Costs • Empower Employees	• SOPs around the County are mostly nonexistent. • Agencies often do not recognize the benefits of conducting business in a standard manner.

Costs:				Payback:		
Low	Moderate	High		Low	**Moderate**	High

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Identify needed practices/procedures	▓	▓										
2. Assign responsibilities	▓	▓										
3. Establish agreement on scope	▓	▓										
4. Develop SOPs/review/revise		▓	▓	▓	▓							
5. Formally document and distribute (via the intranet)			▓	▓	▓	▓						
6. Train personnel			▓	▓	▓	▓						
7. Implement/Maintain			▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	240,000	110,000	
Operations:		62,500	62,500
Total:	240,000	172,500	62,500

Capital Costs: Associated with developing SOPs in years 1 and 2.
Operations Costs: Continue annually indefinitely.

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[16] Kenneth Friedman, Ph.D., "Guide to Writing Standard Operating Procedures," Dept. of Journalism and Communication, Lehigh University (March 1998).

OUTCOME MEASUREMENT

- Assigned responsibilities to develop and maintain
- Established and maintained SOPs
- Utilization and adherence
- Changes in staff productivity
- Improved quality of work

B3. Strengthen system security.

The fundamental tenet of information security is controlling access to information and resources that require protection from unauthorized review, illicit modification, and obstruction of access. Very often, security protection is classified into the following categories:

Timing: **PHASE ONE**	Difficulty: **MODERATE**
– Lack of internal expertise. – Requires full-scope assessment of current security status. – Funding is necessary to both assess situation and strengthen protection.	

- Confidentiality: The protection of the information against disclosure to unauthorized agents
- Integrity: The preservation of the data and the means to keep it from unauthorized or surreptitious modification
- Availability: The accessibility of information to authorized users in a timely manner

Control over data involves technical aspects (e.g., firewalls, applications, database and operating systems engineering, intrusion-detection systems), business process issues (e.g., separation of duties), procedural guidelines (e.g., incident-response and employee-termination checklists), and policy specifications (e.g., authorized use of the Internet). A comprehensive strategy must address all of these areas.

The County has issues in addressing security that have risk implications. The security posture of the County is decentralized management and administration, with no agency or department responsible for creating and governing standards designed for the security of the whole. This distributive blueprint may work well for localized infrastructure or help desk support but is not fitting for enterprise security in which any of the thousands of entry points into the wide area network can be used as a point of entry into the data and operations of other users. The result of the decentralized approach to security is characterized by a lack of current and uniform application, technical, business process, procedural, and policy controls. The lack of central management, the magnitude of the County's wide area network, and the fact that the perimeter to the Internet is not adequately guarded mean that security threats from both within and outside the organization may have already been realized but not detected.

Direct exposure points of the County include the following:

- Liability in the event that confidential human resource information was to be compromised and then made public.
- Liability in the event that healthcare and justice records were to be subverted.
- Threats to disruption in County operations and public services due to unauthorized manipulation of data or denial of service attacks.
- Business threats based on compromised integrity and availability of financial and other operational records
- Threats to County personnel and systems based on a lack of physical security.
- Inability to communicate and coordinate a response to an attack on County information technology assets.

The County can make significant gains in securing its networked systems and data, but the process will require centralization of security management and the deployment of new technical, process, procedural, and policy solutions. Examples of necessary improvements, with corresponding benefits, include the following:

- Execution of a comprehensive third-party information security assessment that is designed to identify and assess the specific threats facing the County. The deliverable from this assessment should outline detailed risks and ways in which the County can reduce exposure from both internal and Internet-based threats.

- Implementation of Countywide security policies and procedures that cover the specific hazards outlined in the risk assessment. Areas that should be covered are noted in Table 34 below.

Table 34: Needed Security Policies/Procedures

Potential List of Significant Policies/Procedures
Acceptable Internet use
Acquisition assessment
Auditing and logging
Application development and deployment
Operating system management
E-mail usage
E-mail storage
Extranet usage for activity on the frame connection with vendors
Information sensitivity and leakage
Passwords
Portable systems' (Palms, laptops) data storage and security
Remote access
Security roles and responsibilities
Risk assessment
Router security
Server security
Workstation procedures

Time spent designing and implementing policies and procedures will provide returns in three ways, namely, decreased likelihood of security events and loss, legal protections for the County from liability in the event that end-users conduct illegal activity using County-networked resources, and greater uniformity and efficiency of County technology assets.

- Enhanced technical controls over County local and WAN traffic that prohibit subverted hosts in one location from gaining access to other systems located on the County infrastructure. Proper security requires this capacity to contain subverted systems on a network as large as the County's. It is likely that firewalls, host-, and network-based intrusion detection systems will be required to suppress internal threats or compromised systems from being used to undermine other technology assets.

- Creation of an Information Security Manager, reporting at a high enough level to ensure compliance, responsible for establishing, monitoring, and confirming the implementation of security improvements. A single officer participating in active oversight of the security function will help ensure that there is defined and specific accountability regarding security concerns.

Security is a function that requires adequate preplanning and ongoing maintenance to be successful. The very nature of technology security requires the capacity for rapid change and adjustment to evolving threats. When examining the makeup of a successful security implementation, there are five functions that should be recognized to establish a sound program:

Assessment: This provides for the organization to have an ongoing understanding of its risk and specific vulnerabilities. While this often initiates with a third-party review, it is maintained through internal staff.

Protection: This includes the deployment and maintenance of enhanced security systems in the forms of hardware and software.

Management: This is the staffing component that can include internal or outsourced security specialists.

Training: This consists of instruction and awareness for users and technology staff. This can range from advanced technical training to simple user awareness of the threats contained in e-mail or reckless Web surfing.

Response: This can take the form of incident response plans and costs associated with damage to the network due to successful subversion through viruses or other malicious activity.[17]

Only by addressing each of these areas will success in information security be fully achieved. Security should be thought of as an ongoing process that impacts and involves all hosts and users sharing County data.

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[17] http://www.scmagazine.com/scmagazine/sc-online/2001/article/033/article.html

BUSINESS CASE

The number and costs of security incidents are rising considerably across the globe. The United States Department of Justice reports that 85 percent of those surveyed reported successful security breaches, with 64 percent acknowledging financial losses due to the breaches. Not all public institutions have successfully implemented prudent policy, and a number of these have suffered high-profile security incidents. Locally,

- In January 1996, at least $200,000 of damage was done to the King County Public Library's computer system when an unknown suspect from Garfield High School's computer lab crashed the system for 12 days;
- The Washington State Legislature Web site was defaced with inappropriate subject matter in May 2001;
- In December 2000, the University of Washington Medical Center was the target of a hacker who compromised patient privacy by accessing thousands of medical records for heart patients, which contained names and social security numbers.

In each of these instances, there were costs associated with fixing the damage as well as the damage to the stature of each of these agencies that were successfully subverted. While the harm to an agency's stature is difficult to measure, it is known that the costs of fixing destruction done by hackers and malicious code is skyrocketing because of the increased complexity and malevolence of the attacks. For example, the 1999 "Melissa" virus did damage totaling roughly $80 million worldwide, and the more recent "I Love You" virus had estimated costs of $10 billion. To prevent future threats and help protect the County's assets, strengthened security is in order. A particular focus on network and application security should be a first priority.

By conducting a security and risk assessment, the County will be positioned to make prudent decisions based on obtaining an acceptable return on the security investment. Strengthening system security will help prevent several types of losses at the County, including data loss, costs of rebuilding technology, and direct financial loss. The preliminary costs are related to securing the County's infrastructure equipment and software. Ongoing costs include system maintenance and upgrades as well as the cost of personnel. At minimum, these initial costs will begin at $450,000 of capital and $171,000 moving up to $321,000 for operations thereafter to strengthen security through monitoring and protection activities. While these initial expenditures would be a start for enhanced security, a more systematic and costly security plan will likely identify additional needs. The cost/benefit relationship demands an increase in protection of the County's systems. It is assumed that through this increased protection, significant cost avoidance will occur.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Standards		• Security policies and plans are extremely limited.
• Planning and Design	• Manage Data and Information	• Security staffing and management oversight is limited.
• Unattended Business Functions		• The systems protecting the County are piecemeal, underperforming, and fragmented.
		• Security weaknesses exist in various systems.
		• There is no "Countywide" plan to address security.

Costs:				Payback:		
Low	**Moderate**	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Hire a security officer	█	█										
2. Conduct security assessment	█	█	█									
3. Analyze findings			█									
4. Develop a plan addressing deficiencies			█	█								
5. Develop a security policy			█	█								
6. Implement security enhancements			█	█	█	█						
7. Perform regular testing and maintenance				█	█	█	█	█	█	█	█	█

Costs	Year 1	Year 2	Year 3
Capital:	450,000		
Operations:	171,000	321,000	321,000
Total:	621,000	321,000	321,000

Capital Costs: Associated with security implementation.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Security assessment
- Intrusion detection and monitoring capabilities
- Number of attempted intrusions
- Number and value of losses due to computer penetration

B4. Strengthen business continuity capabilities.

The County is not currently prepared for a major disruption in technology operations. There is no comprehensive plan for conducting business in the event that operations and access were to be made unavailable without warning, either through natural or malicious causes. The lack of attention to an overall plan is considered unacceptable and should be

Timing: **PHASE ONE**	Difficulty: **MODERATE-HIGH**
– Requires significant skills and time to prepare plan. – Significant funding/resources are required to provide robust ongoing protection. – Next steps include analysis/modeling to define mission-critical applications and level of service to be provided.	

remedied as soon as possible. Without a business continuity plan the County is not prepared to manage critical operations in the event of a major catastrophe.

The level of planning must consider all aspects of technology-driven operations at both the enterprise and agency level. This includes mainframe and server recovery, telecommunications, networks, and, more importantly, those mission-critical functions that depend upon technology, such as payroll, public relations, emergency preparedness, and transportation. All of these items must be addressed in a properly developed plan.

Based on business needs, the County may plan for business continuity using a comparison of costs and recovery response time for mission-critical systems. The comparison should include an examination of each relevant component of preparedness; for example, the facilities options available for the data recovery aspect of business continuity can be categorized as follows:

- Cold Site: A separate facility located a set distance from current operations that can be quickly converted to handle data access and minimal operations.
- Mutual Backup: Two separate agencies or organizations that have an agreement to host each other's operations if necessary.
- Hot Site: A redundant data center with preconfigured hardware, software, and data access capabilities.
- Remote Journaling: A hot site where periodic transmission of data is conducted, thereby decreasing the time needed to restore data if tapes were to remain available during the catastrophe.
- Mirrored Site: A fully redundant operations center equipped for instant availability.

Following the proper needs analysis, the County may consider pursuing shared emergency resources with another organization that operates a similarly complex environment. For example, the State, the City of Seattle, the Snohomish County PUD, the University of Washington, or even local vendors or companies such as Weyerhaeuser could be considered as potential colocation candidates for shared facilities, systems, and possibly even staff.

How the County chooses to operate under a disaster scenario is a matter for further analysis and discussion. In addition to needs and costs, the County's business continuity approach should carefully examine the County's current risk exposure and any available disaster mitigation and avoidance systems that are already in use. To determine what continuity efforts will be required, minimum operational levels must be defined and priorities agreed upon. Once plans are established, resources will be required to ensure that plans can be implemented when needed.

BUSINESS CASE

September 11 changed everything. As information technology departments in both the public and private sectors review budgets and goals for the upcoming year, one thing is now clear: disaster recovery and business continuity now have a more prominent place in technology planning and design. The traditional disaster recovery plan that simply outlines the data to be backed up and identifies restoration procedures is no longer considered adequate. While data retrieval and system recovery are still key components of such a plan, a solid preparedness design must handle aspects previously not addressed, such as transportation, communications, and insurance.

Proper planning can directly lead to successful recovery in the event of disaster. For example, while many business functions were crippled during the 2001 terrorist events in New York City, Merrill Lynch was able to resume business within minutes. The online Disaster Recovery Journal outlines the response:

> Within a few minutes of the evacuation Merrill Lynch was able to switch its critical management functions to their command center in New Jersey . . . Since the command center had been pre-designated in corporate-wide contingency plans, all personnel immediately knew where to dial into and transfer information. This allowed transactions throughout the company's global offices to continue as usual.[18]

This recovery was achieved despite the fact that over 9,000 employees were displaced, as were thousands of phone lines and data transmission conduits used by the company.

Another example of a prepared organization is the Tacoma Public School District, which operates an IBM mainframe and supports over 15,000 devices on its network connecting some 50 sites. The District has both a disaster recovery plan and a formal agreement with Weyerhaeuser to host the District's primary computing system in the event of a disaster.

The financial justification supporting this strategy is found in the concept of insurance. Like insurance, disaster preparedness establishes a system of protection that enables an organization to get back in operation in a timely and cost-effective manner. While there are costs or premiums required to maintain the plan, these are necessary to protect the County if a catastrophe were to occur.

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[18] http://www.drj.com/special/wtc/1404-04.html

Establishing a resource base to support a sound recovery plan can be costly. In the event of a major disaster, recovery will require considerable attention at all levels in the organization. Resources needed include all major assets used in operation today including (1) facilities and utilities, (2) hardware and software, (3) data, (4) trained personnel, and (5) planned processes and procedures.

The financial payback supporting preparation is tied to probability and the risk of loss. Cost models may be developed to compare preparedness expenditures against the potential risk of loss under disaster scenarios. At some point, executive management will decide upon a break-even point at which a certain level of preparedness (and therefore expenditures) will provide a specific level of technology service if a catastrophic event occurs.

Numerous commercial entities have ceased operations because of the catastrophe in New York City. Though going out of business is not deemed an option for the County, "being out of business" in relation to technology for lengthy periods is a real possibility. This scenario is assumed to be unacceptable in relation to the County's charter and responsibility to service its citizens and employees. In this case, the reasoning behind this strategy is not to seek a positive return on investment (ROI), but to avoid unacceptable downtime and to be able to continue to deliver on the County's core mission of service delivery. This strategy specifically addresses one of the four deficiencies related to King County identified in Governing.com's Government Performance Project 2001, related to the lack of a disaster recovery plan.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Unattended Business Functions • Standards	• Manage Data and Information • Improve Processes • Establish Communication and Collaboration • Optimize Analysis, Assessment, and Improvement Practices	• Current plans address data only. Hardware, infrastructure, telecommunications, and mission critical operations are not covered. • No agency has ownership/ responsibility for Countywide planning. • Existing plans are dated and focus on ITS. • Significant downtime exposure.

Costs:				Payback:		
Low	Moderate	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define mission-critical applications	▓											
2. Determine minimum/preferred level of service	▓											
3. Identify potential preparedness options.		▓	▓									
4. Review current status — level of resource availability		▓	▓									
5. Assess "gap" between needs and existing resources		▓										
6. Model different scenarios		▓	▓									
7. Discuss and make decisions about level of service/approach			▓	▓								
8. Document business continuity plan with budget				▓	▓							
9. Gain approval					▓	▓						
10. Implement plan/access resources						▓	▓	▓				
11. Test (ongoing)							▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	450,000		
Operations:			
Total:	450,000		

Capital Costs: Associated with analysis and planning.

Operations Costs: Expected out year costs related to implementation and support not yet defined.

OUTCOME MEASUREMENT

- Vulnerability and risk assessment
- Plans developed
- Alternative/backup resources identified/established
- Tested recovery scenarios

C. Architecture

Nine architecture strategies have been developed as part of the strategic technology plan. Architecture strategies address implementation and deployment of Web-based, integrated, and infrastructure technologies. Related to architecture strategy development particular areas of concern include the following:

- Lack of standardized infrastructure, hardware, and applications software
- Lack of standardized Web-based technology
- Lack of uniform technical approach when integrating applications
- Heavily customized software applications that are challenging to maintain
- Continuing proliferation of servers without consideration of capacity or placement
- Lack of design, plans, and related agreements around the deployment of broadband to achieve convergence and disintegrated telephony systems
- Lack of best practices supporting enterprise data management
- Disaggregated and nonstandard workflow between agencies, as seen in Procurement, Human Resource/Payroll, Finance/Accounting, and within Law, Safety, and Justice functions
- Dual Financial and HR/Payroll systems being operated

C1. Standardize technology including infrastructure, hardware, and applications software.

As made clear in the assessment process, the County lacks standards for many fundamental technology components. Standards are missing for such basics as cable, active electronics, hardware, and software. Other more advanced technologies, including voice, video, and wireless, are also lacking standards. This strategy is specifically defined to address and reduce the dozens of types of different hardware and software platforms in use, especially in cases in which the varying platforms support the same business functions.

Timing: PHASE ONE	Difficulty: LOW-MODERATE
– To be successful in pending utilization, must achieve Countywide participation, building consensus related to particular technologies to be used. – Will require time to phase in, as technology is phased out. – Some agencies already have de facto standard technologies in use. – Requires leadership, funding, and new technologies supporting standards implementation.	

Standards are important for two main reasons. First, technologies tend to be more supportable, meaning that the County will be able to operate technology for longer periods at lower costs. With longer lifecycles, there is ample opportunity to reduce the cost of maintenance. Second, the operating environment will tend to be more manageable and used by more agencies and personnel. In the marketplace, more people are typically trained on standard technologies, and these platforms connect and integrate with many more options, which again lowers the cost of the operating environment over the long term.

In reality, standards are often established by the market where popular products are embraced by the masses. This is not to say that the County must have just one standard for a particular technology, but the premise of managing fewer technologies versus many stands as an efficiency determinant. Having compatible technologies is also important. Infrastructure standards are needed in the areas of operating systems, databases, hardware, enterprise applications, and operating tools.

The County does not need to move to standards overnight. As old systems are replaced and new ones deployed, standard components may be implemented. Developing standards is not difficult. Essentially, those involved in development must arrive at a common understanding of business needs and then move to consensus related to defining the technology that may meet those needs. The notion of needing standards to address future technology deployment cannot be overstated. This is because standards generally can accommodate the majority of technology that is required within the County. Wherever possible, we recommend the County migrate to systems that are either standard in the marketplace or leaders in their respective fields (and as long as the systems are a good fit).

BUSINESS CASE

The business case supporting standards is based upon a solid cost-avoidance strategy. Many of the above-referenced standards are already de facto in the County as well as in the marketplace. Over the long term, standards will provide more technology functionality — for less money. The benefits of standardization, therefore, are directly tied to cost prevention and even reduction. The costs involved in operating nonstandard infrastructure may be reduced by replacing equipment (at the most opportune time), reducing the amount of maintenance required, and ultimately saving staff time. It should be noted that standardization does not require significant out-of-pocket costs to implement. Standards may be implemented as systems are replaced and new technology is deployed.

Standardization of infrastructure will ultimately reduce the total cost of ownership (TCO) of networked systems. While standardization may be vendor-neutral with a "best of breed" philosophy guiding the purchase of components, there are often benefits to standardization with a single vendor. With a more standardized model in place, the County will benefit in several ways. The area of infrastructure and active electronics is used to represent benefits.

Standards benefits include the following:

- Enhanced monitoring capabilities and quality of service. Similar devices using standard protocols allow for ease of management that can alert network administrators when connectivity is threatened, often before users even realize there is a problem. If standardized to a single vendor, specific monitoring applications such as CiscoWorks can be deployed — a further enhancement of monitoring capability.

- Easier firmware upgrades. With standard hardware and firmware in place, upgrades will be performed in a cost-effective manner, even from remote locations. This differs widely from the current model in which engineers must "track down" such upgrades and install on a case-by-case and manual basis.

- Less troubleshooting time. Poor cabling is a common cause of network connectivity errors and one that requires technicians to often spend lengthy periods of time testing and tracing connections. With standardized cabling, upgraded where needed, these types of disruptions can be minimized.

- Reduced staffing. A concentration of active electronics experience and knowledge that applies to all devices contained within the infrastructure will reduce the need for an assortment of technical skills related to different vendors.

The same benefits apply across the board to major components of hardware, software, and infrastructure. All of the areas represent the potential for reduced operating costs due to a more standardized approach to technology deployment.

Standardization should not necessarily involve the needless replacement of sound equipment for the purposes of common systems. A comprehensive cost/benefit analysis should be conducted in each instance, with the benefits of standardization factored into the process. Since many of the cost savings associated with this strategy are found over the long term and in reduced expenses, deliberate attention should consistently be applied to take account of these hidden savings.

The benefits and resource savings through standardization will outweigh the limited costs of implementation. This goal provides the County with both quantitative savings in the form of reduced maintenance costs and extended functional life spans as well as qualitative results such as performance improvements and greater support efficiency.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Standards • Planning and Design • Hardware Standards	• Manage Data and Information • Increase Revenues and Control Costs	• There is no detailed uniform methodology in place to establish standards. • As of yet, there are few enterprise-level standards guiding agencies in their efforts. • Critical standards are missing in the architecture, service delivery, operations, and management areas. • Standards are sometimes developed but are not enforced. • Few standards exist in the area of active electronics (hubs, routers, switches) • No formal standards exist (personal computers)

Costs:				Payback:		
Low	Moderate	High		Low	**Moderate**	High

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Identify potential alternative standards for each relevant technology	▓	▓										
2. Evaluate technologies' advantages, disadvantages, risks, budget, time frames	▓	▓										
3. Compare one to another	▓	▓										
4. Review against County business goals		▓										
5. Discuss and select		▓	▓									
6. Implement standards			▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	225,000		
Operations:			
Total:	225,000		

Capital Costs: Associated with project to define standards.

OUTCOME MEASUREMENT

- Established standards in required areas
- Active adherence
- Oversight compliance

C2. Standardize Web-based technology used on the intranet, Internet, and extranet.

The growth of Web-based application deployment has been increasing over the past several years — a trend that will impact the County's intranet presence as it relates to providing information to internal employees, the organization's Internet site that provides Web-based data to the public, and the extranet, which is the Web-based

Timing: PHASE ONE	Difficulty: LOW

– Must achieve alignment among a number of groups already using other tools.

– Requires procurement of some products.

– Training and follow-up execution will be essential to take advantage of standards.

interface for external business partners. So far, County Web sites and Web-based applications have been built using a variety of development tools (in various languages), including Microsoft Visual Studio, the ASP scripting environment, Cold Fusion, WebPutty, and others. As the County moves toward increased use of the Internet, it needs to standardize the technology being deployed. There are literally hundreds of software products available to support the development of Web applications. To remain efficient, the County must search out a set of products that best fit its needs, and then develop and maintain use of standard tool sets over time. Web tools are being evaluated as part of the system upgrade process, and will again be considered when enterprise systems are acquired.

As described elsewhere in this plan, there are three main categories of Web applications in use at the County: intranet, Internet and extranet. Although these are aimed at different audiences and support different applications, all three categories should make use of the same set of tools. There are four different tool sets that the County will need to consider for standardization. A number of them have already been identified and are in use, as shown in Table 35.

Table 35: Web Technology Tools

Tool Set	Current Environment	Potential Environment
Web Server	Microsoft IIS	• Microsoft IIS
Application Server and Development Environment	MS Visual Studio\ASP Cold Fusion WebPutty Arc Info Web tools	• Microsoft tools as basic platform (ASP, .NET). • Open/Java tools acceptable for departments that can provide their own support. • Evaluate market viability of WebPutty before setting as enterprise standard.
Content Management	None	• Market options include Stellent, Interwoven, and Microsoft Content Management Server. Continue with current selection process; emphasis should be placed on tools with standard features, low maintenance, and compatibility with the environment.
Enterprise Portal Tool	None	• Market options include Microsoft SharePoint Portal Server, Plumtree, Epicentric, and Viador. Select a moderately priced product that provides basic features, solid market share, and compatibility with other tools.

Today there are two primary technology directions from which to chose: the Microsoft .NET platform or the multivendor Java – J2EE platform. We recommend that the County select one of the two as its enterprise standard. The Microsoft environment may be the strongest option for the County. The organization already has substantial experience with Microsoft products, the products are reasonably priced, and the products provide many of the standard features needed. The recent additions to the Microsoft product line in this area (Content Management Server, SharePoint Portal Server) also appear in line with County needs. The Open/Java platform may also be acceptable, especially for development in agencies that have sufficient technical resources already.

Several other development tools are also in use at the County. The most recent addition is WebPutty, which is being used for development of an LS&J application. The product is compatible with Microsoft's .NET architecture and can produce functional systems with little effort. A major drawback of this tool set is the requirement of unique expertise. WebPutty should not be promoted to enterprise use until it has been proven in the marketplace and until the County decides that a substantial amount of development will take place using this tool.

Standards also need to be set for Web development, content management, and enterprise portal tools. In each of these areas, high-function and high-priced products are available, but there are also products that are more moderately priced that should provide most of the features needed by the County. Tools selected should be affordable, have a solid market share, and fit into the County's standard operating environment.

BUSINESS CASE

The standardization of Web technology development tools, content management applications, and enterprise portal suites will provide a variety of direct quantifiable benefits. Most of these benefits are tied to cost avoidance. These include the following:

Increased productivity of development staff. With a common development language and tool set, Web programmers will need to be proficient on only a single platform, thereby requiring less training and "ramp-up" time. Also, as a single platform is implemented, overall expertise and effectiveness with the established standard will increase at a faster pace than if developers were having to learn numerous different tools.

Less reliance on senior developers. Content and portal management tools will allow nondevelopers to safely create Web pages that can then be posted to the Web with less intervention from specialized development staff. These tools take much of the sophistication and difficulty out of the process of Web authoring and posting. Clearly, there will still be the need for quality assurance, but the skill sets for page development will be decreased, as will the cost. This could in turn lead to the greater use of less specialized and less expensive staff to achieve equal or greater Web-authoring results.

Greater project flexibility and less retraining. Standardized applications and platforms will allow for County developers to move between projects with less time needed for retraining. This will also create a larger pool of staff in the County with skill sets that can support all necessary Web pages, allowing for a more complete support environment. In the long term this will result in quantifiably less training costs and greater project support.

Reduction of licensing costs. Bulk licensing on a single product, as opposed to the costs and maintenance of several smaller licensing agreements, is generally favorable to the consumer. For example, the bulk purchase of Microsoft Visual Studio through current County agreements with Microsoft could lead to less per-seat expenses for the product.

Easier integration. As Web sites evolve and integration with other sites or with databases becomes necessary, a standardized platform will reduce the cost of garnering expertise either through consulting or training on the complexities and requirements of such business integrations. A single platform will allow for smoother integrations between applications due to increased effectiveness of internal staff, less complex data handling models, and the ability to reuse integration patterns and methodologies from previous projects.

The costs associated with this standardization of tool sets will include the purchase of the hardware, software, and related maintenance agreements, staffing, and training. A specific sampling of these potential expenses includes new high-end servers to be used for development of the code, licensing and maintenance agreements for Visual Studio.NET and Cold Fusion, increased training on the new applications for changes in the coding process (particularly in regard to the .NET architecture), and a content management system for handling versioning and application development process

issues. In comparison with the substantial savings related to standardization, the costs are relatively affordable. This strategy is considered to be an "easy win" for the County in terms of cost/benefit. While benefits are potentially significant, the costs to implement this strategy also add up. Capital costs are associated with hardware and software, and will continue to be required annually to add capacity. Ongoing costs will also be expended for staffing, training, and software.

The movement toward Web technology is a clear trend that will not stop. The action plan for this strategy is based on making rapid selection decisions, obtaining favorable licensing arrangements, and providing for a common tool set and platform for use by County developers.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Standards • Planning and Design • Internet/Intranet Access	• Improve/Expand Services • Optimize Analysis, Assessment, and Improvement Practices • Established Communication and Collaboration	• Mainframe data structures and system architecture do not provide an efficient way to publish "real time" data to the Internet. • The County intranet is rapidly expanding in a relatively unmanaged manner. • Little work has been done on the extranet with respect to infrastructure development. • Countywide development standards have not yet been established.

Costs:				Payback:		
Low	**Moderate**	**High**		**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define standard architecture tools	▓	▓										
2. Evaluate and select appropriate products, and negotiate favorable purchase agreements		▓	▓	▓								
3. Purchase and install products		▓	▓									
4. Hire staff as required			▓									
5. Obtain training (developers and users as required)			▓	▓								
6. Use for development and maintain products and environments			▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	340,000	150,000	150,000
Operations:	309,000	674,000	1,001,000
Total:	649,000	824,000	1,151,000

Capital Costs: Associated with hardware and software, and continue annually.
Operations Costs: Continue annually indefinitely for staffing, training, and software.

OUTCOME MEASUREMENT

- Selected standard tool sets
- Utilization of tools once selected

C3. Standardize County technical approach for application integration.

Whereas previous discussion has addressed systems management at a data level, this strategy addresses the need for integrating related applications. Currently there is limited integration between County systems. The task of integrating systems is challenging but also a high-payback proposition. A well thought out technical approach is needed to achieve

Timing: PHASE ONE	Difficulty: HIGH
– Requires enterprise strategy (map) to be effective.	
– Agency personnel responsible for the systems must work together to achieve integration.	
– Accurate cost/benefit analysis and planning should precede integration.	
– Often consumes a fair amount of resources and time to connect systems.	

integration, as is careful ongoing project management to guarantee success.

The County should establish a standard technical approach to use for integration. Integration technology is complex and potentially costly. A standard approach will directly reduce the risk of conducting unnecessary technical work and exposure to high costs.

Current examples of direct application of this strategy involve the Law, Safety and Justice areas as well as Financial and HR/Payroll applications.[19] In LS&J, the cumbersome data manipulation needed to extract meaningful information from the various systems is an inflexible and inefficient approach. Under a more integrated application model, the resulting gains in information sharing would be significant. In regards to HR/Payroll, a more integrated standard will allow for data extraction and reporting that simply is not reasonably feasible with the current mixing of PeopleSoft and MSA platforms. This in turn will allow the County to more properly manage its resources due to significantly enhanced information availability.

What integration does currently exist has been developed using point-to-point communications. By using this approach, custom connections have been programmed between each of the related systems. While simple to start out with, use of point-to-point integration eventually results a complex web of interactions, as shown in Exhibit 13. The alternate approach, called a hub-and-spoke architecture, uses an intermediary system or database as a central exchange of information. The central database approach is more reliable and has more ability to respond to changes because there are a limited number of connections to maintain.

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[19] See expanded discussion of these areas on pages 183 and 187 of this document.

Exhibit 13: Point-to-Point vs. Hub-and-Spoke Architecture
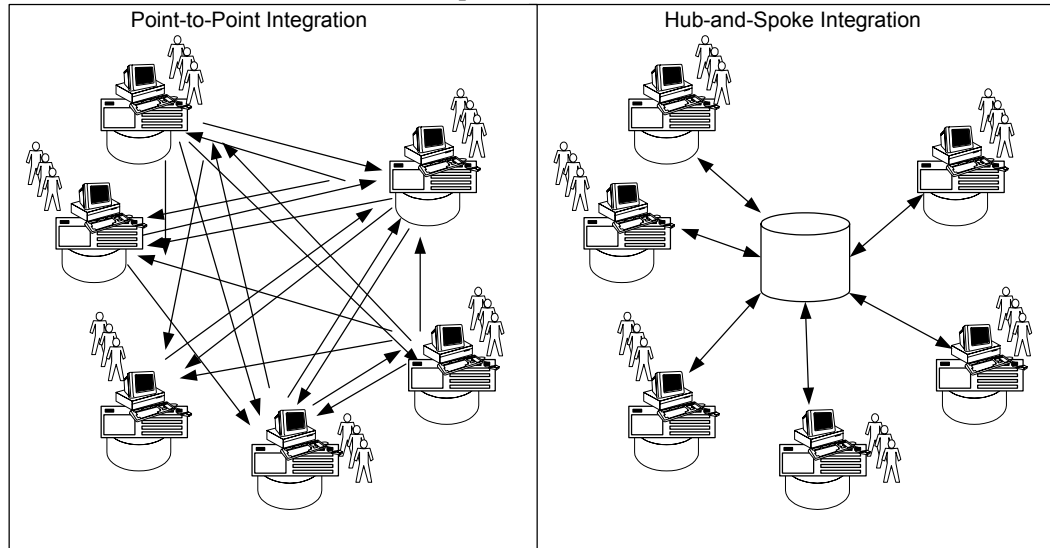
Because each system communicates with only the one intermediary, there is increased opportunity to share data and standardize the way information is passed from system to system. A number of different technologies are available to achieve this integration, ranging from a staged data warehouse approach to a more real-time approach in which transactions are exchanged directly via an intermediary broker system. The market for integration software is full of competing and overlapping products. These products can be expensive to purchase and maintain. The County should study the products available to select those that best fit its needs.

The types of technology available to the County may be classified by the time lag involved in the exchange. In general, the shorter the time lag, the more expensive and fragile the interface. Table 36 shows the different types of integration, rated from slowest to fastest, and their characteristics. The right-hand column lists some examples of products in each category. Some of the examples of the products are listed, although products may fit into more than one category.

Table 36: Data Integration Technology

Type	Description	Sample Technologies	Representative Products
1. Point-to-point file transfer	Periodic sending of entire file between two systems	FTP, e-mail, mainframe utilities, ETL tools	Operating system vendor tools
2. Hub data mart	Validated data posted to sharable hub for approved users to access	Extract-Transform-Load (ETL) tools	Ascential DataStage Informatica Software AG EntireX
3. Asynchronous messaging	Message stored until receiver calls for it	Message-Oriented Middleware (MOM)	MQ Series
4. Synchronous access	Program-to-program communication via API.	Com, CORBA, J2EE, CICS	Vitria, Tibco, CICS
5. Shared database access	Applications directly access the same data; immediate and complete	SQL queries, heterogeneous DB query middleware	Native SQL, ODBC/J.D.BC, IBI, Nimble Technologies

The County currently has licenses to several of the integration tools, but they are not widely used. The most advanced product is MQ Series, IBM's messaging-based integration product. It receives messages from applications that it places in queues and delivers them to their destination. MQ Integrator is an add-on module that brings advanced features such as data validation and manipulation. To improve application integration the County will require tools from each of the categories listed.

The best integration approach will depend on the requirements of a particular situation. Guidelines should be developed to encourage selection of the most appropriate method that will provide the greatest long-term benefit and lowest total cost of ownership to the County. The County should also identify specific products to use for each class of integration. It may be in the County's best interest to identify a preferred vendor for each. Integration projects should be evaluated from an enterprise perspective to identify opportunities to combine projects, enable other users, and to establish hub-and-spoke approaches that will promote longer system life spans.

Funding for application integration needs to be considered in the process. Integrating systems requires that changes be made to several systems at a time. County technology projects, however, have been typically funded based on the needs of only one application. In the future, the County should define project charters to include integration with other systems, where appropriate, and include the funding necessary to make changes to related systems.

BUSINESS CASE

Integration should be made a clear priority at the County. Specifically aimed integration projects will be needed to resolve issues with existing legacy systems, but as new system projects are defined, each new project should also be evaluated for its integration needs, and integration should be funded and included in the defined project scope. Implementing integration technology can be expensive, but the improvements in workflow efficiency and reduction of point-to-point complexities generally pay for such technologies.

The County is currently spending hundreds if not thousands of hours creating and managing data and application integrations. "One study estimated that 30 to 40 percent of the time spent developing applications in a major enterprise was spent on 'data issues': identifying the sources of needed data, evaluating them, extracting and transforming data, dealing with data quality problems, and correcting software errors due to data-related problems. All of these activities would be completed more rapidly and at lower cost with an improved data design and integrated architecture."[20] Going forward, creation of a single interface would allow the County to eliminate one or more redundant systems, allow job functions and/or entire work groups to be redeployed more effectively, and eliminate problems from conflicting and unreliable data. If integration projects are performed without standardizing the technical approach, the County will face the cost and complexity of maintaining multiple, differing technical environments.

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[20] http://www.intelligententerprise.com/000101/scalable.shtml

During integration, several different technologies may need to be implemented, but by matching the needs of critical projects with the particular solution, these situations may be managed reasonably. Integration projects should be overseen by the County Data Resource Manager and make use of the County Enterprise Data Model, in order to achieve the most out of the systems.

How can the return on integration be evaluated? The following areas of cost savings for the County should be considered for each system:

- Reduced cost of writing and maintaining point-to-point, single-use integration interfaces
- Decreased deployment times for new application integration projects, allowing the County to successfully implement enterprise applications in a shorter time frame because of shorter development cycles for the integrations
- The extended life of legacy systems through the integration of new functionality and data retrieval methods as opposed to completely replacing these older applications
- Operational system productivity gain (e.g., system response, load and processing time) as a result of increased efficiencies brought about by the integration
- Increased ability to handle currently unforeseen data and application mergers with other governmental entities in a cost-effective and timely manner

A particularly relevant example of the beneficial use of EAI is the Idaho National Engineering and Environmental Laboratory. This federal agency was able to make of use legacy VSAM and Adabas data through an EAI application that provided data and reports to users in a unified format through a web-browser interface. "Before this new application was implemented, users had to enter four different applications to have access to this data. Now users can run one report and, by following the hyperlinks, access information from the main applications."[21] An extensive ROI study was completed by the agency, which documented estimated break-even results in twenty-six months.[22] A comprehensive cost benefit analysis and EAI implementation enacted at the County may provide similar results.

Cost avoidance and investment return on this strategy will come in many forms. Significant examples of this include the reuse capability of application scripts and methods as well as the ability to use the same toolset for multiple integration projects. Most of the costs avoided are in the area of developer time and maintenance of the costly point-to-point application interfaces. The County should approach EAI knowing that the up-front costs of implementation may be significant, but the return on this investment will benefit the organization for years to come.

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[21] http://www.intelligenteai.com/feature/010216/feat1.shtml
[22] Ibid.

Related Technology Needs:
- Data Management
- Planning and Design
- Improved Integration Between Systems
- Upgrade and Replace Dated Systems

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Implement Technology Initiatives
- Improve Processes
- Integrate and Establish Partnerships

Related Deficiencies:
- The current tendency to create point-to-point integration between systems creates a complex web of interfaces that are difficult to maintain.
- Integration is significantly lacking around the County.
- There is no County policy regarding how systems should be integrated.
- TMB members identified lack of hardware and software technology as a major impediment to achieving integration.

Costs:				Payback:		
Low	Moderate	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Establish integration guidelines	▓	▓										
2. Evaluate integration tools		▓										
3. Conduct cost/benefit analysis related to integration approach		▓										
4. Select methodology for integration		▓										
5. Develop plan for integration		▓	▓	▓								

Costs	Year 1	Year 2	Year 3
Capital:	250,000		
Operations:			
Total:	250,000		

Capital Costs: Associated with cost/benefit analysis.

OUTCOME MEASUREMENT

- Developed guidelines and methodology
- Selection of integration tools
- Completed cost/benefit analysis
- Plan for integration
- Reduced redundancies and streamlined workflow

C4. Purchase and integrate top-quality commercially packaged software wherever possible and cost-effective — and with minimal customization.

The County has a long history of developing customized systems. The results of this approach are seen directly in the number of legacy software systems operating. In contrast to the convention of building customized applications, this strategy looks to establish a new direction whereby standardized commercial packages are considered as a first option for deployment if such packages meet critical business needs.

Timing: **PHASE ONE**	Difficulty: **MODERATE**

– Requires a change of thinking to consider commercial products, and also to minimize customization.

– End-users must accept more standardized and simpler ways of performing a task, rather than automating historical processes.

– New approach demands learning new systems and aggressively managing vendors and implementations.

For this strategy to succeed, a change in culture at the County is necessary. During systems evaluation processes, County employees must examine new ways of conducting business, rather than automating existing processes. The change of thinking will require a new approach for conducting systems analysis. For example, when examining a potential systems change, the process should be to first define required business workflow based on needs and industry best practices. Once requirements are defined, alternatives analysis may then be conducted, including an examination of "make versus buy" scenarios. Once alternatives are compared with one another, an objective decision may be made as to how to proceed. The evaluation process followed should generally follow a standard framework whereby advantages and disadvantages are considered, including life-cycle costs, benefits, and risks where relevant.

A fundamental reason why this strategy makes sense is that standardized software packages often provide more functionality and have less implementation risk in comparison with customized systems. The total costs of ownership are also commonly less than those associated with a comparable customized system. The importance of considering packages is particularly timely for the County as new systems are being contemplated. For example, packaged systems should be considered as an option for the following:

- Financial, Accounting, and Reporting
- Billing (if not able to use the enterprise system)
- Assessor (some applications)
- HR/Payroll
- Law, Safety, and Justice

It should be recognized that packaged systems will not always meet the needs of the County. Particular circumstances will demand customization, including when business requirements are unique, and corresponding packaged software functionality is not otherwise available. Specific functionality is the key determinant.

BUSINESS CASE

It is generally regarded as best practice to implement packaged software. This is especially true when business requirements are standard, as is the case, for example, with most Financial and HR/Payroll systems. In standard circumstances, consideration should first be given to purchasing packaged applications before considering the option to build an in-house system. A packaged solution may appear to cost more up front than building a solution, but total cost of ownership will be significantly lower over time.

Some of the primary benefits of prepackaged software include the following:

- Deployment time: A packaged solution most often decreases the absolute and elapsed deployment time when compared with building a system in-house.
- Customer focus: A packaged solution allows the organization to focus on the end-user rather than the programming.
- Cost-effectiveness: A packaged solution typically has a significantly lower total cost of ownership than a custom application, particularly when workflow changes, integration, and maintenance are considered over the long term.

In contrast, the challenges behind customization also often provide supporting arguments for selecting packaged software in lieu of programming. These arguments address the following:

- Maintenance: Customized systems are frequently a challenge to maintain.
- Dependence: Organizations become reliant on particular programmers and are at risk for loss of staff.
- Training: The costs associated with end-user and technical training are continuous and often high.
- Obsolesces: There is potential that the functionality provided by custom software will soon be provided by a vendor, therefore rendering the custom solution obsolete.
- Time constraints: Custom solutions typically require more time for problem resolution, both in implementation and over time as systems are maintained.

The cost/benefit analysis supporting procurement of packaged solutions must be examined on a case-by-case basis. To achieve benefits, it is assumed that software applications will be implemented properly. Generally, if the County's needs are similar to those that exist in other organizations, third-party software packages will suffice, often meeting over 80 percent of end-user needs. In contrast, when functions are unique, systems may be customized if done cost-effectively. One way to evaluate alternatives is, if packages only meet 80 percent or less of needed functionality, customization may be considered as a cost-effective option (if systems are built economically and reliably). This strategy specifically addresses one of the four deficiencies related to King County having procurement standards that are inconsistently applied identified in Governing.com's Government Performance Project 2001.

Related Technology Needs:
- Standards
- Data Management
- Improved Integration Between Systems
- Upgrade and Replace Dated Systems

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Implement Technology Initiatives
- Improve Processes
- Utilize Cost-Reducing Technologies

Related Deficiencies:
- Numerous additional stand-alone databases have been developed for tracking data that are not maintained in the separate systems.
- Business analysis is not performed across agencies where it could be used to promote cross-agency system efficiencies.
- Business analysis and modeling is not occurring at sufficient levels to adequately support decision-making processes.
- Risk analysis is often left completely out of the picture.

Costs:

Low	Moderate	High

Payback:

Low	Moderate	High

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define new approach to conducting alternatives analysis	■	■										
2. Discuss approach at BMC/TMB		■										
3. Select approach		■										
4. Document agreement		■	■									
5. Communicate new process to agencies		■	■	■								
6. Utilize new approach as required				■	■	■	■	■	■	■	■	■

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	Costs will be absorbed internally.		
Total:			

OUTCOME MEASUREMENT

- Number of procurement processes considering third-party options
- Number commercial software products in use
- Number of customization projects; planned, underway, and completed
- Amount of standardized system integration in place
- Lower total cost of ownership

C5. Consolidate hardware around the County.

The County is presently operating over an estimated 300 servers and hundreds of additional printers and other peripheral devices. Because systems have been acquired in response to incremental needs, there has been limited analysis that has occurred in terms of managing overall capacity at a

Timing: PHASE TWO	Difficulty: MODERATE-HIGH
– Requires significant expertise to prepare plan.	
– Consolidation efforts will likely require some new equipment.	
– Consolidation will take time and resources.	

Countywide level. Particularly lacking has been analysis related to the potential for shared processing and storage.

Representative review of hardware reveals the potential for consolidation at numerous points across the County. This study observed numerous opportunities in at least eight agencies in which both servers and printers could likely be consolidated and eventually save funds and provide more capacity overall (more detailed study is necessary to confirm). Related to servers, this strategy focuses on centralized server hosting when possible, while maintaining an appropriate number of agency server bays at other locations as needed. Another area requiring analysis is in the area of printers since a move towards more powerful centralized printers may significantly lower the total costs of printing for desktop users. This strategy is related to the strategy of reorganization but may be pursued separately in order to address the benefits associated with optimizing capacity. Long-term, continuous hardware consolidation should be managed through an established comprehensive asset management function.

The costs and risks associated with operating unnecessary data centers cannot be ignored. Consolidation into more centralized areas of operations will not only allow for easier management, but will also help eliminate the storage of servers in areas that are not properly secured or where temperature controls are not in place. A number of the County's servers are housed in less than optimum conditions. In short, the array of data centers across the County is both inefficient and heightens the level of exposure to information and asset loss.

<div align="center">

BUSINESS CASE

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Numerous advantages exist to support moving forward with consolidation. Key among these are (1) centralized hosting providing efficient maintenance, administration, and security; (2) optimizing facilities investments that exist at central sites; and (3) providing shared backup and support. Perhaps most important is the long-term benefit of reducing the number of servers (possibly reaching an estimated 10 to 15 percent) and maximizing capacity by acquiring fewer and larger state-of-the-art boxes. At the County, capacity may be better managed, reducing the amount of time, money, and effort required to operate and maintain the environment.

Consolidation will save money in many ways, going beyond simply saving the costs associated with the purchase and maintenance of redundant systems. Other types of savings include the following:

- Reducing the number of support staff: Centralized servers and printers require less maintenance and monitoring, which can be done by fewer staff.
- Reducing the amount of network support: Fewer servers and printers means a less complicated network, making the domain structure easier to manage and configure.
- Reduced risk: Each County server running a Web server puts the County at a higher level of risk if the device is not closely monitored. Fewer Web servers means lower levels of operational risk and security support.
- Reduced application support: Properly scaled and configured, database and application servers can be consolidated, reducing the upgrade and patching process for these applications.

Future network redesigns may also be considerably simplified through consolidation. For example, the County's current plans to upgrade to Windows 2000 Active Directory will be impacted because consolidation of servers and elimination of superfluous domains will reduce the risk of problems during migration.

The decentralized model of agency and department computing has been repeatedly shown to be an ineffective way of managing such resources. The Gartner Group reports that "increasing the average number of users per server from 75 to 300 reduces total cost of ownership (TCO) by a whopping 44% and reduced LAN TCO by 15%."[23] Moreover, a recent survey by Computer Economics, Inc., showed that 69 percent of organizations that completed a consolidation project showed a favorable return on investment.[24]

There will be challenges in the implementation of this strategy. Depending upon the path selection, the out-of-pocket costs of consolidation may be significant, related to the timing and impact of moving application hosting and eliminating servers. For large agencies, control management and consolidation may not reduce the number of servers or support staff required to maintain such systems. This strategy assumes that many of the County's servers will also be consolidated somehow into reconfigured data centers. Both space and costs will be affected in this process. Further, numerous agencies have significant investments in hardware, facilities, and knowledge that the County will not want to lose. Finally, some agencies have a charter to protect their systems and data — which will come in the form of maintaining control over systems and privacy of operations. More analysis and planning will determine precisely where the best opportunities are located in terms of hardware consolidation. Once further analysis is conducted, it is likely that some short-term consolidations may occur, while others could be phased in over time as equipment ages and requires replacement.

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[23] http://www.win2000mag.com/Artciles/Index.cfm?ArticleID=8455

[24] "Consolidation Project Survey," *Computer Economic, Incs* (November, 2001)

Related Technology Needs:
- Unattended Business Functions
- Standards
- Data Management
- Planning and Design

Related Business Goals/Objectives/Directions/Opportunities:
- Manage Data and Information
- Improve Processes
- Increase Revenues and Control Costs
- Reorganize and Restructure
- Utilize Cost-Reducing Technologies

Related Deficiencies:
- There is no standardization of hardware and operating system.
- Decentralized model is not making best use of technology assets.
- The County does not have formal programs established for sizing, selecting, and ordering equipment.
- With multiple different technologies in use and the number of people involved, it is difficult to track and monitor exactly what protection exists.
- The geographic dispersion of the servers makes it difficult to maintain a security standard across the County.

Costs:

Low	Moderate	**High**

Payback:

Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Inventory servers					▓	▓						
2. Conduct detailed server-capacity study					▓	▓						
3. Assess applications that may be moved					▓							
4. Define plan to determine how to move applications/servers						▓	▓					
5. Determine servers that may be eliminated or replaced						▓	▓					
6. Assess location and network connectivity						▓	▓					
7. Establish connectivity							▓					
8. Acquire new equipment as required							▓	▓				
9. Consolidate servers, move applications							▓	▓				
10. Work with end-users in transition							▓					

Costs	Year 1	Year 2	Year 3
Capital:		1,400,000	
Operations:			
Total:		1,400,000	

Capital Costs: Associated with hardware purchase and consolidation.

OUTCOME MEASUREMENT

- Physical move of servers to central locations
- Use of available capacity
- Lowered costs of long-tem operations on a per-unit basis

C6. Use broadband technology and a fully integrated PBX architecture as the future centerpiece to converge data, voice, and video transport.

Currently, the County is operating and maintaining the WAN, linking hundreds of LANs together between the agencies. In 2001, the County also began production and operation of the I-Net fiber-optic network. If properly designed, managed and operated the I-Net fiber network and existing King County WAN fiber optic network have sufficient capacity to handle voice, data, and video simultaneously, to serve existing as well as new applications and thousands of network customers cost-effectively. The long-term plan is to use broadband technology to the fullest extent possible. In this process, a

Timing: PHASE THREE	Difficulty: HIGH
− No design or plan exists in the County to do convergence. − Significant funding is required for start-up. − Personnel and skills are lacking, including management, operations, and support. − Uncertainty exists related to how to manage network to achieve maximum benefits. − Must build operations capability either by outsourcing and/or hiring and training in house. − Management is essential to provide organization and control to operations; as of now, management is not at level needed. − Skills will need to be sought from outside the County organization.	

converged network will be constructed to serve multiple applications and provide for a cost-effective delivery mechanism. Broadband fiber-based technology provides an excellent foundation from which to consolidate and operate the County's network.

This strategy directly supports the process of achieving network application convergence. Convergence is the concept for satisfying all voice, data, video imagery, and other applications, and all access, transport, and other service requirements over a single converged telecommunications facility. Convergence would consolidate the three distinct networks currently employed in the County (King County WAN, Voice, I-NET).

Changes to the County's current infrastructure will be required to implement broadband as the converged backbone network. While there are some limitations to the current ATM transport supported by the Marconi edge devices used in the I-NET, broadband is well positioned in a significant number of County facilities. As such, an effort should be undertaken to use the combined backbone network for as many of the current network services as possible. In addition to the ATM delivery, judicious allocation of the existing unused, or "dark" fiber will also allow the County to build a gigabit Ethernet delivery system for high-speed transport of data across the County. The ATM and gigabit Ethernet technologies can co-exist in the County WAN in order to leverage existing network resources.

The ATM platform lends itself well to voice transport as well as 10Mbit (and below) data transport, however the current Marconi ATM hardware used in I-NET has speed limitations, whereas the ATM hardware used in the King County WAN is scalable. The County could identify those users (at a department or division level) that historically use the most bandwidth, classify them as gigabit nodes, and use the I-Net and King County WAN fiber and gigabit Ethernet to serve these locations. Competition among first-tier providers (Cisco, Extreme, Riverstone, etc.) has resulted in favorable pricing for the carrier-class equipment that will be needed. Gigabit Ethernet, by design, can be implemented incrementally to provide significant improvements in bandwidth and performance as needed. The existing fiber WAN links owned by the County should be integrated in this process into the broadband network in a spur configuration that links connected agencies back to the broadband network for transport across the County.

a) *Converged Network Architecture*

Components of the broadband (King County WAN and I-NET fiber facilities) implementation include the following:

- *Transport Network Evolution* — The County will migrate leased facilities to the broadband network for data, voice, and video transport. Management of the network must include attention to growth, equipment-upgrade requirements, security, disaster recovery, training, change control, maintenance contracts, outsourcing, enterprise applications requirements (e.g. financial systems), and network services implementation.

- *Network Security and Fraud Protection* — The network will be designed to prevent unauthorized access to network resources and data. Security-screening techniques will be used to allow access to systems and applications as required but to disallow access by all unauthorized uses.

- *Scaleable Bandwidth* — The network will be designed for scalability to meet bandwidth demands.

- *Standards Based* — All transport network devices will be based on industry standards. The standards and specifications will be documented and made available for service level management and agreements.

b) *Converged Network Operations*

Successful operation of a broadband network requires a group of qualified personnel trained with, and in possession of, the necessary tools to efficiently manage the converged network. A broadband network has significant potential and benefits. A broadband network requires a higher level of management and monitoring in relation to its performance and utilization than is currently in place. At a minimum, management considerations should include the following:

- *24x7 passive monitoring of traffic on all segments.* Performance standards need to be determined and monitored with special attention to utilization of bandwidth. Staff needs to be able to interpret this data and make changes as appropriate up to and including equipment and/or software enhancements or replacement.

- *Scheduled preventative maintenance on all key components.* This may require an inventory and possible adjustment of core equipment to insure n+1 redundancy that allows for preventative maintenance to be conducted.

- *Live coverage by either dedicated County staff or outsourced to a qualified entity.* If such is not possible or is deemed unnecessary, a provision needs to be included that automatically pages on-call personnel during "nonstaffed" hours. The system needs a level of sophistication that continues to page and escalates, as defined by severity, until response is received.

- *Management of outsourced service providers.* A written service-level agreement with the Service Providers (AT&T, Verizon, and others) is required to access vendor facilities where equipment resides. This agreement needs to address space, power, environmental, and maintenance-related issues with clearly delineated responsibilities and specific restoration criteria.

The broadband network will enable the County to start taking advantage of the convergence of voice and data. Introduction of this fundamental technology change will enable the County to cost-effectively deploy new application and service-delivery capabilities that do not currently exist. While there are important considerations related to the deployment of active electronics (necessary to use the broadband network for voice services), the broadband network will position the County to benefit from advanced convergence technologies. A simple example of convergence involves replacing the Centrex phones with telephones that are served on the Ethernet WAN. The County's existing Centrex contract with Qwest cost's exceed $2 million per year.

As the County integrates its WAN services across the broadband network, every LAN port will have the capacity to become an access point for voice services via IP telephony technology, namely Voice over IP (VoIP). VoIP is discussed in tandem with broadband because broadband connectivity is critical to the implementation of this new technology. While innovative in its design, VoIP has some significant design and installation considerations. The County's current broadband network provides a suitable transport mechanism for VoIP while use of leased line WAN connections for this technology may, upon close review, be found to be insufficient in bandwidth. As the County reviews VoIP options and vendors, it will be important to consider cabling requirements since these can negatively impact the quality of VoIP communications. In particular, use of VoIP should be limited to those locations that are cabled to exacting standards as set forth in TIA/EIA 568. Gigabit Ethernet switching could also be a foundation for VoIP in those areas where it is fiscally prudent. In those areas where the Telco provider central office services (Centrex) support staff for voice and leased lines for data, a consolidated VoIP solution could potentially save significant dollars (especially in those facilities where inter-County telephone calls are typically toll calls).

VoIP applications could be implemented as soon as standards are developed, a set of procurement documents crafted, and services acquired. The technology to utilize broadband as a County "telecommunications utility" is available now. The implementation of this application will place additional demands on the network

routers and switches and will need to be factored into any new network design and hardware upgrades. The integrated network will allow King County to migrate to VoIP where prudent or harvest the investment in legacy PBX systems were VoIP is not prudent.

The bottom-line focus of this strategy will be to develop a migration path that capitalizes on voice connectivity between current PBXs using the broadband capacity while looking toward an IP-based transport for future applications.

While standardization of voice-switching systems is desirable, the County should also recoup its investment in Nortel and NEC systems. From a financial perspective, it is considered impractical to force consolidation around a single brand at this time. A migration over time to a standard system is the best way to allow the county to use the existing hardware and reduce management and operations expenses where the business requires new features. Recent industry technology standards enable networking of disparate brands of voice-switching systems. The move to an integrated network will position the County to select and migrate to a switching system standard while allowing continued use of its legacy systems investment.

In regards to voice traffic, an integrated voice-switching system will combine the County's disparate systems with a common dial plan, provide redundant access PSTN (public switched telephone network), and provide consistent features and functionality. The purpose of this strategy is to reconfigure systems to directly deal with voice system risk mitigation, E-911 caller safety, deteriorating switching platforms, and to control maintenance costs, and provide expanded and new services

The integrated voice systems network design will enable expansion and distribution of services from existing voice switches and avoid proliferation of additional switches. The integrated voice-switching network will be based upon the network transport facilities obtained from the centerpiece broadband network, and will replace the County's existing voice-switching systems network transport (which is primarily via leased circuits obtained from local exchange carriers). Exploiting the broadband network to serve systems needing replacement as remote sites of healthy service platforms will mitigate obsolescence of existing voice-switching systems.

The preliminary steps and critical path for this project will encompass the following tasks:

1. Complete an inventory of all WAN equipment, documentation and schematics.
2. Perform a full assessment on current WAN functionality, responsiveness and usage.
3. Inventory and review all County phone charges related to Centrex and leased circuits.
4. Review current service level agreements with WAN and phone service providers.
5. Identify the current and expected WAN bandwidth needs of each agency.

Once these steps have been conducted then formal design plans, cost benefit analysis studies, system selections and pilot implementations can commence, as outlined in the Gantt chart at the end of this strategy.

Convergence is being successfully and cost-effectively deployed in today's marketplace. Citing recent trends, a Cisco white paper details that "a recent META Group study found that 26% of global 2000 enterprises are already in the process of migrating to a converged network." The paper further states, "Convergence has progressed to the point that most organizations should seriously evaluate its role in the future of their networks." Cisco goes on to say that "moving to a converged network can substantially reduce an organization's total cost of ownership for its network, and reduce the ongoing costs required to maintain and upgrade the network . . . through the elimination of multiple sets of infrastructure, simplified administration/maintenance, and consolidation of IT staffs." A high-level list of benefits from this report is provided in Table 41.[25]

Table 37: Convergence Benefits

Business Empowerment	• Reduction in network infrastructure costs • Reduction in staffing and administration costs • Reduction in facilities costs
Enhanced Personal Productivity	• Unified messaging • Personal communication assistants • IP video solutions • IP phones and IP soft phones
Improved Workgroup Productivity	• IP video solutions • Collaboration tools
Enhanced Customer Care/Responsiveness	• Multimedia contact centers • Collaboration tools

The implementation of broadband technology provides the County with new opportunities to take particular advantage of in the short term. Two are particularly noteworthy, including the potential elimination of leased lines and the reduction of local access services. Related to leased lines, a physical inventory of all the lease lines and an audit of the invoices have a high likelihood of revealing unused or unneeded private leased lines. These unused or unneeded lines could stem from lines that were used at some time in the past and then were disconnected or from duplicate lines that serve the same facility. Further, organizations frequently find that the carrier providing the service fails to remove the service from invoices, and through changes customers are able to recoup significant expense by reconciling bills.

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[25] Cisco Systems, "The Strategic and Financial Justifications for Convergence," [electronic white paper]. Available at http://www.cisco.com/offer/tdm_home/pdfs/iptelephony/roi.pdf

Convergence will provide the County with centralized management and coordination of data, imagery, and voice. While the costs of such endeavors will be high, the returns on a well-planned and properly managed move toward convergence will bring a high return for the County. The benefits in efficiency and decreased lower cost of ownership found in convergence mark this strategy as one that can enable the County to be more productive at considerably reduced expense over the long term. Merrill Lynch's convergence savings can be summarized in the question put forth by their CTO before beginning the successful project, "Indeed, before he'd even plugged in the first VOIP handsets, he saw a way to cut Merrill's phone bill. 'I'm paying for the voice circuits to carry phone calls around the block or around the world," McKinley says. "And I've paid again to put in this great data network, which has grown huge in order to handle this gusher of information. Can't I have some convergence and start moving my voice traffic over the data network?'"[26] The cost savings for this project amounted to a 25% reduction in phone charges.[27]

The introduction of broadband convergence not only leads to greater cost effective communication but also enables expanded functionality of current and future applications to be utilized. In the words of the leaders on the Province of Alberta's SuperNet broadband project, "We heard it at meeting after meeting, time and time again, 'If only we had the bandwidth, we could do this. We don't have the bandwidth to do it'"[28] With added bandwidth between governmental entities and with business partners, the effectiveness of those applications that require streaming data (such as audio and video conferencing) or large file transfers (e.g. GIS, CAD and graphic design collaboration) can be significantly improved.

The long-term strategy also calls for a thorough examination of the use of Centrex. The migration toward standard telephone systems in all locations will simplify demands on the support organization. The County may also find that premise-based telephone systems are less expensive than the Centrex service. The reduction of Centrex services may occur as a result of an audit of such services that will likely provide a path to reduced operations. The methodology for this audit should include a physical inventory at the sites that use Centrex and then a comparison of such site utilization against received invoices. Experience has shown that, when lines are moved or disconnected, the billing records do not always track the actual Centrex services being used.

The initial benefit of PBX integration will be a reduction in the current costs paid annually for leased circuits. It is estimated that the bulk of these services will be moved to the broadband network, which when netted against the voice-switching factions pro rata share of the broadband network costs, could yield savings between $250,000 and $500,000 per year (with savings to be confirmed through further detailed analysis). Another primary benefit of an integrated voice systems network design will be the option of expanding and networking existing proprietary voice-messaging systems rather than purchasing a single replacement system for the centralized and obsolete Pulse Point voice mail system. Such a design will reduce catastrophic single point of

[26] "Merrill Lynch Phones Ahead," *Fast Company*, October 2001. Available at http://www.fastcompany.com/online/51/merrill.html.
[27] Ibid.
[28] Cisco Systems, "Province of Alberta Success Story," [electronic white paper]. Available at http://www.cisco.com/warp/public/779/ibs/vertical/publicsector/

failure risks and leverage existing legacy system investments. A key benefit of this move will be risk reduction and establishment of new disaster recovery options. The integrated voice-switching network will have alternate PSTN access points to minimize the currently dominant dependence on Qwest's Seattle 06 central office.

The cost of optimization of the voice-switching network is tied to three phases of work. The first phase takes the preliminary steps outlined in the previous section where a complete, detailed inventory and assessment will be conducted. This work will provide the County with the clear benefits of moving forward with additional investments. The second phase will provide a detailed design to integrate voice systems into a finely tuned distribution system. The third is full-scale upgrading and implementation of the design, whereby network facilities and equipment will be upgraded, reconfigured, or replaced. The costs of the first preliminary study phase is estimated to be about $200,000. The second phase of design and development of specifications for procurement is estimated to be in the range of $100,000 to $150,000. The costs of the third phase are dependent on the anticipated agreed upon and specified design, and are indefinite at this point. When comparing the above-introduced benefits to such costs, payback may be achieved within several years if systems are designed and operated in a proper manner.

Related Technology Needs:
- Proactive Service Delivery
- Neglected Technology Management Functions
- Improved Integration Between Systems
- Telephony
- Internet/Intranet Access
- Improve voice communications with the public and county employees.

Related Business Goals/Objectives/ Directions/Opportunities:
- Improve/Expand Services
- Manage Data and Information
- Implement Technology Initiatives
- Integrate and Establish Partnerships
- Optimize Analysis, Assessment, and Improvement Practices

Related Deficiencies:
- Delivery area for the WAN is limited.
- Bandwidth on T1 circuits is fixed and not easily upgradeable.
- No agreed infrastructure cable standards have been established.
- King County's voice-switching systems have evolved into a disaggregated collection of disparate, distributed systems.
- ATM is a solid transport vehicle for voice when such transport is at a DSx basis (i.e., T1 or DS3); however, it is not the correct vehicle for VoIP and not the preferred transport for IP.
- Telecommunications management is generally fragmented around the County.
- Services are not managed consistently or from an enterprise perspective.
- Several of the PBXs are at the end of their life cycle.
- The centralized voice mail system appears at capacity without an option for hardware expansion or software upgrade. The current voice mail system is 14 years old and has been determined to be "nonserviceable" by its vendor. It is tentatively scheduled for replacement.

Costs:			Payback:		
Low	Moderate	**High**	Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define and acquire skills			■	■	■	■						
2. Assign responsibilities			■	■	■	■						
3. Inventory WAN, PBX and I-Net equipment and operations			■	■	■	■	■					
4. Inventory Centrex and leased line costs			■	■	■							
5. Review current SLAs			■	■	■							
6. Define agency needs			■	■	■							
7. Develop needed standards						■						
8. Determine operations/management model						■						
9. Establish SLAs and management reporting functions						■						
10. Establish quality assurance function						■						
11. Identify alternatives						■						
12. Conduct cost/benefit analysis						■						
13. Develop a design and plan						■						
14. Begin prototyping unified PBX and network							■	■	■	■		
15. Test									■	■		
16. Confirm benefits/viability									■	■		
17. Expand capabilities/migrate to converged backbone											■	■

Costs	Year 1	Year 2	Year 3
Capital:	350,000	1,290,000	2,530,000
Operations:		325,000	552,000
Total:	350,000	1,615,000	3,082,000

Capital Costs: Associated with project planning, hardware and software purchases, and contracted assistance.
Operations Costs: Project staffing requirements and training.

OUTCOME MEASUREMENT

- Broadband architecture defined and implementation begun.
- Infrastructure in place and tested
- Personnel skills and know-how available and managed (whether internal or external)
- Connected nodes utilizing capability with satisfied customers
- Service-level agreements in place
- Service-level management reports available.
- Operating center with 24x7 performance
- Return on investment
- Operational, integrated voice-switching system
- Uptime reliability
- Lower costs of operations

C7. Institute Countywide best practices for enterprise data management.

The two most pervasive data problems identified by the agencies surveyed during the planning process were "improve integration between systems" and "eliminate duplication between systems." The challenge of improving data management is significant, and the County is not alone in this area. Data problems are

Timing: **PHASE ONE**	Difficulty: **MODERATE-HIGH**
– New function requires support to be successful. – Requires understanding of enterprise business model, processes, and systems. – Requires new hire and/or skill sets to establish and continue data management.	

common in large and complex operations. There are a number of actions, however, that should be initiated to improve the situation:

- Create a new position of County Data Resource Manager responsible for monitoring and promoting the proper use of data.
- Define a County data policy that encourages data sharing and sound data management practices, including accountability for data ownership and stewardship.
- Develop high-level enterprise data architecture to use as a template to guide data management efforts.
- Use analysis and modeling techniques to understand, document, and improve County processes and databases, and standardize techniques used across the County.
- Oversee County system projects to help achieve better use of data.

Best practices may be used to make improvements in data management. The best-practices approach is centered on two principles: (1) develop an architecture to guide systems development and (2) establish accountability for its use. The effort should focus on the most critical data items. As a part of this Strategic Technology Plan project, numerous critical data items were identified. These data elements are fundamental to improve the County's ability to operate more efficiently. For illustrative purposes, definitions of each data type are shown below in Table 38. The County should use this list as a starting point to begin defining standardized best practices for data management.

Table 38: Critical Data Types

Data Type	Description
Information	Where and how to find information, who owns it, what it is
Account/Budget	Financial accounts and their associated balances and budgets
Service	A service provided by the County to its constituents and partners
Law/Regulation	Laws and rules of and related to the County
Project	A County project that uses people, equipment, money, etc.
Employee	A person who works for the County (salaried, contract, or other)
Legal Subject	A person of interest to County Law, Safety, and Justice functions
Partner	Business or government agency that deals with the County
Facility	County buildings, roads, compounds, etc.
Parcel	A parcel of land in the County
Equipment	Devices, vehicles, computers, etc. managed by the County
Constituent	A person who is a recipient of County services

As a central part of best practices, an enterprise data model will be needed to identify the data types most important to the County. Typically there are several computer systems connected to each data type, and the model will show the most important relationships between the data types. Once defined, the relationships can be used to identify key integration points between systems. For example, best practices data modeling will prove that an interface could be developed between the County's parcel management database and its facility management database. Interfaces and integration are addressed in a later strategy providing further support for sharing data around the County.

<div align="center">

BUSINESS CASE

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Data management is a high-payback proposition. If done well, it is likely that the County can avoid large, expensive data integration projects, and avoid the duplicate cost of implementing different versions of the same system. Business processes will function more efficiently when connected through a smooth flow of information. When data is not coordinated or shared, entire work groups may need to be created to resolve the disparate and broken processes that result (as is the County's situation today). Data resource management is a necessary function to lead the County toward integration. It is possible that by adding one –to three centralized data management professionals, the County will potentially save multiple other positions and avoid the cost of unneeded projects and countless amounts of hours spent working with unnecessary processes.

Enterprise modeling will play an integral role not only in planning and designing data warehouses but also in coordinating technology efforts throughout the entire enterprise. A document published in *The Data Administration Newsletter* speaks to the benefits of best practices through an enterprise data model (EDM).

Some of the key benefits are described as follows. The EDM —

- Allows the entity to develop an enterprise perspective. One of the key purposes of the modeling effort is to develop "common threads" and compile "cross-functional, common definition[s]" of entities within the enterprise, thus making the model easier to read for a broader audience.[29] This means that more stakeholders may better understand how other individual business units use information, and then be positioned to identify opportunities to reduce redundancies, capitalize on others' efforts, etc.

- Allows the entity to develop and define strategic information needs. The model helps to isolate data from specific contexts and frame it within business terms that "will support growth and new initiatives." By defining entities in business terms, opportunities may be identified that support and offer options for success to the business.

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[29] Long, Kathy, "The Enterprise Data Model: A Key Ingredient For Successful Data Warehousing," *The Data Administration Newsletter*, Issue 5.0, June 1998.

- Supports the development of business data stewardship. The subject matter experts who become involved in the modeling effort will become the "strategic data stewards" responsible for the "accountability, control, shareability and quality management of enterprise data." The data stewards represent those people most familiar with the data and are not limited to technology personnel. With stewardship, the modeling effort will naturally account for the business perspective and will help define ownership of data.

The above benefits will provide the enterprise with a means to tie together its processes and improve data tracking. The development of an EDM will also benefit any data warehousing efforts that the County undertakes. Two key benefits are as follows. The EDM —

- Provides the basis for a warehouse atomic-level data store. Most warehouses designed today consist of a central repository of normalized data that is referenced by multiple functional data marts. In this context, the EDM provides the blueprint, and referencing the EDM will ensure that the atomic data store is built on a forward-thinking data model and with a solid understanding of cross-functional entities.

- Provides support for developing a warehouse release strategy. Because EDM defines the integration points between primary entities, provides insight into the complexity of information, and supports the gap analysis between strategic information needs and current availability, it assists with the development of a phased implementation and long-term data management effort.

Cost avoidance and reductions related to this strategy are numerous and include the following: reduced data management costs, reduced operating costs, reduced report generation and distribution costs, reduced system costs, and reduced distribution costs, among others. For example, a review of the Government Performance Project conducted by *Governing* magazine revealed praise for enterprise data management efforts undertaken by other counties, cities, and states participating in the study. Technology Award winners included a governing entity that developed a robust data management system and warehouse to store and analyze tax information for its citizens. The system allowed the governing body to review nearly 260,000 taxpayer accounts in a few months, which, it is estimated, would have otherwise taken 68 years to do with its previous processes and systems.[30] Such an operation would not have been achievable with the County's data structure.

The impact of poor data management can often be difficult to ascertain because manual reworking of data many times takes place during the report preparation process. As one vice president states, ""Data quality has remained a closeted issue in IT because there's little visibility at the management level that the problem is occurring. Generally, data would have gone through many days of manual rework before it's presented in a report to senior management." [31] However, the impact of such mismanaged data clearly hits the

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[30] Diane Kittower, "Technology Award Winners: Putting Technology to Work." *Governing Magazine* (October 2001).

[31] Beth Strackpole, "Wash Me, " *CIO Magazine*, (February 15, 2001). Available online at
http://www.cio.com/archive/021501/data.html

County's bottom line, in the words of one high-ranking IT specialist, "Our studies in cost analysis show that between 15 percent to greater than 20 percent of a companies' operating revenue is spent doing things to get around or fix data quality issues"[32]

With further case study, the potential impact on the County's operations from use of an enterprise data model may be analyzed from both qualifiable and quantifiable standpoints. The action plan for this strategy is centered on assessing the need for a data resource management (DRM) organization, implementing standards, and developing a data model for the County. Assessment will include a study of the costs and benefits related to establishing DRM. During the analysis, the County may find that data warehouses are needed. Success in data management will also require the cooperation and assistance of agency staff to implement desired improvements.

Related Technology Needs:	**Related Business Goals/Objectives/ Directions/Opportunities:**	**Related Deficiencies:**
• Data Management • Improved Integration Between Systems • Planning and Design • Agency Coordination	• Manage Data and Information • Implement Technology Initiatives • Optimize Analysis, Assessment, and Improvement Practices	• There is no Countywide data planning occurring outside of certain agencies, particularly GIS. • There is a lack of awareness of the concept of data ownership and stewardship. • Without standards and a business-oriented data model, Meta data is hard to obtain. • Data standards are agency specific and used inconsistently. • Different standards and designs have been used over the years related to database design and functionality.

Costs:

Low	Moderate	High

Payback:

Low	Moderate	High

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define enterprise data management requirements	■	■										
2. Develop policies and standards for data management	■	■										
3. Develop data model framework	■	■	■									
4. Identify alternatives for moving forward		■	■									
5. Analyze alternatives			■	■								
6. Conduct cost/benefit analysis			■	■								
7. Determine approach for enterprise data management			■	■								
8. Develop plan and define EDM methodologies				■								

[32] Ibid.

Costs	Year 1	Year 2	Year 3
Capital:	500,000		
Operations:			
Total:	500,000		

Capital Costs: Associated with cost/benefit analysis.

OUTCOME MEASUREMENT

- Cost/Benefit analysis
- Defined approach
- Established data model framework
- Framework utilized as a foundation to integrate systems and guide development efforts
- Integrated systems through a common data language
- Redundancies eliminated

C8. Design and implement a common architecture to integrate workflow between Law, Safety, and Justice agencies.

The LS&J agencies work together on a daily basis. Paperwork moves by the thousands of pages while records pass from the sheriff to the prosecutor and jail, from the prosecutor to the courts, and frequently back again to the jail. Neither the technologies nor the processes used to support these agencies are standard. Much of the technology resides on the mainframe and is customized.

Timing: PHASE THREE	Difficulty: HIGH
– Despite closely aligning business workflow, agencies have been operating disaggregated processes for years, which will be difficult to change. – Complex detailed workflow – is challenging to realign – Separate agencies with different centers, are operated by separate the elected officials and judges. – Scope of multiple systems is large, so that significant change will demand lots of elapsed time, labor resources, and funding. – Little understanding or study has occurred over the years.	

The current level of workflow between agencies is cumbersome and inflexible, and it is clear that future efforts need to focus on streamlining the handling of this data. The County could spend millions of dollars in an effort to move to a sophisticated paperless environment, but because of the costs and risks involved, this is not considered to be a near-term or risk-controlled option.

A more viable option is to implement integrated workflow through a well-designed multiagency system. This may be accomplished by streamlining workflows; improving data management; and implementing simple, standardized, and integrated functionality. This approach will effectively establish links between agencies aligning data, personnel, and information processing. Along the way, it is assumed that fewer documents will be produced as more data is managed in an automated, rather than manual, format. It is possible that lower-cost, standardized systems may be used as a primary component to support the new architecture. The gist of this strategy focuses on integrated design and automating the incremental workflow within and between agencies. This "step-at-a-time" approach will keep costs and risks relatively low.

This strategy is consistent with the objectives of the County's LS&J Integration Project, which has defined integration as being needed on at least three different levels, including (1) point-to-point data sharing; (2) operations, and (3) consolidation of manual activities. The simple integration solution promotes application migration over time and makes the most sense for the LS&J arena because it is the most complete, practical, and cost-effective. The integration effort will be supported by a set of standard development tools that will be used by the various agencies involved. The next steps in the integration process will be to study workflow, develop requirements, acquire tools and possibly applications, and then prototype new records workflow. Implementation of this strategy may include purchasing and implementing software applications. Packaged software may be implemented either within agencies and/or between agencies.

BUSINESS CASE

Currently, the County has an LS&J integration project underway, being conducted by a BMC subcommittee. As a result of this work, 10 quantitative and 12 qualitative opportunities have been identified to improve and streamline existing operations. Identified opportunities focus on major business functions. In addition, quantitative opportunities are defined to achieve time savings associated with activities such as jail bookings and classifications, court calendaring, and criminal history research. In total, over 5,400 hours per week may be affected or reduced. Qualitative benefits have been identified in such areas as electronic case filing, warrant management, and reporting. Quantitative and qualitative factors are listed below in Tables 39 and 40, respectively.

Table 39: LS&J Integration — Potential Quantitative Opportunity

Opportunities	Assessment Alignment	Business Alignment	Primary Beneficiary
1. Referral Filing: Electronic submission of police referrals	High	High	Prosecutor
2. Prosecutor Case Filing: Improved creation of filing booking documents	Medium	High	Prosecutor
3. Jail Intake and Booking: Electronic submission of booking documents	Medium	Medium	DAJD
4. Jail Classification: Improved access to required classification information	Low	Low	DAJD
5. District Court Processing: Electronic submission of police information	High	Medium	District Court
6. Court Calendaring: Coordinated and computerized court event scheduling and management	High	High	Multi
7. Public Inquiry Response: Web availability of public court information	Low	Medium	Multi
8. Criminal History Research: Improved access to criminal history information	Medium	Medium	Prosecutor
9. Case Results Update: Electronic sharing of updated case status and information	Medium	Medium	Multi
10. Jail Disposition Management: Improved access to required program eligibility information	Medium	Medium	DAJD

Table 40: LS&J Integration — Potential Qualitative Opportunity

Opportunities	Assessment Alignment	Business Alignment	Primary Beneficiary
1. Public Safety Info Portal: Make complete public information available to the public	Low	Medium	Sheriff
2. Police Investigation Sharing: Develop a consolidated source for current interjurisdiction investigations	Medium	High	Sheriff
3. Consolidated Law Enforcement History: Make comprehensive criminal history available in the field	Medium	High	Sheriff
4. Updated Referral Status: Share information about referred cases	High	High	Sheriff
5. Inmate Status Reporting Improvements: Improve ability to develop new/ad hoc reports about inmates	Low	Low	DAJD
6. Prosecutor's Paperless Case Files: Support the development of electronic prosecutor case files	Medium	Medium	Prosecutor
7. Electronic Case Filing: Electronically receive, sign, and initiate court cases	Medium	Medium	Multi
8. Improved Warrant Management: Timely and direct warrant information access and management	Low	Medium	Multi
9. Improved Court Status Reporting: Improve ability to develop new/ad hoc reports about court cases and status	Low	Low	Multi
10. Consolidated Inmate Management: Improve ability to manage inmates through consolidated functions	Medium	Low	DAJD
11. Health Service Coordination: Share inmate information with health services to improved inmate care	Low	Medium	DAJD
12. State Correctional Data: Import/export correctional data with state	Medium	Medium	DAJD

Because of the need for integration within the field of Law, Safety, and Justice, numerous other counties throughout the United States have spent considerable time and resources to integrate workflow. The costs have ranged widely, from a low of $5 million in Sacramento County, California, to a high of $30 million in Marin County. The less expensive projects have involved using middleware in the integration process, while more expensive projects have expanded from core integration to developing significant customized functionality.

Given the opportunities targeted by the County, the costs of deployment may be roughly estimated to be in the low eight-figure range. When benefits are weighed against such costs, payback could occur within 10-plus years based upon early estimates of weekly hourly savings. For projects of this size, this kind of financial payback is considered substantial. Given the amount of work occurring nationwide in this arena, more feasibility information is becoming available about these kinds of projects and may be used as a basis for justifying going forward with this strategy. Further analysis is considered necessary to pinpoint the areas in which highest payback may be achieved.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Law, Safety, and Justice	• Manage Data and Information • Utilize Planning Activities • Integrate and Establish Partnerships	• Ongoing costs related to maintenance are considered high relative to the market. • Few staff are currently available to support aging software systems. • There are concerns about the long-term stability as software gets older and is not updated. • County programmers supporting LS&J systems are retiring soon; availability of skilled mainframe programmers is being questioned.

Costs:

Low	Moderate	**High**

Payback:

Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Study records and workflow between agencies			▓	▓								
2. Analyze potential opportunities for connectivity			▓	▓								
3. Define "gaps" between current and potential new processes			▓	▓								
4. Conduct cost/benefit integration analysis				▓	▓							
5. Determine priority points automation/reengineered processes					▓							
6. Develop detailed plan/design					▓							
7. Develop proof-of-concept						▓	▓	▓				
8. Implement permanent workflow connectivity									▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	Cost estimates not available at this time. Estimates may be made once detailed requirements are defined and analyzed.		
Operations:			
Total:			

OUTCOME MEASUREMENT

- Detailed workflow definitions developed
- Feasibility study related to integration confirming benefits
- Confirmation that standardized technology is viable
- Proof-of-concept system automating links between agencies
- Workflow and systems integration reducing manual work steps
- FTE reduction

C9. Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.

The County operates numerous primary business systems that serve all agencies' numerous financial and human resource/payroll functions. The County's current architecture supporting these enterprise functions is fragmented, and the need to integrate systems is discussed widely, well documented, and understood by all levels of management. The solution needed for implementation, however, is not yet defined or agreed upon. This strategy speaks

Timing: PHASE THREE	Difficulty: HIGH
– Multiple agency business models require significant reengineering.	
– Cultural resistance to change is expected to be significant.	
– Little experience is available related to project management on the scale needed.	
– Significant funding is required.	
– Vendor implementers' track records are mixed at best.	

to the need to address the next round of systems migration in a logical and controlled manner.

Under the current scenario, the County processes the same business functions in two different ways. The systems used are not integrated, and different groups of employees support these separate systems through redundant processing, maintenance, and reporting efforts.

Moving to a single, unified platform will entail implementing one set of applications rather than working with the existing two. There are a few different alternatives that may be pursued to replace the current systems. The first is to reimplement one of the existing systems as the platform for the entire County. The second is to reimplement both of the existing systems in an integrated fashion so that they function effectively as a united platform for the entire County. The third is to start anew and implement a comprehensive system from another vendor. Best practices are to utilize one HR/Payroll system and only one Financial system. It is not necessary to move all operations to one single vendor package, as long as the systems are integrated.

Selecting an enterprise solution requires careful analysis to identify the optimal and most cost-effective solution. There are a handful of ERP systems positioned as leaders in the governmental marketplace that are suitable to meet the County's needs. Each package has trade-offs, and none will fit perfectly. The leading systems include Oracle, with 2000 public-sector installations; PeopleSoft, with 650 public-sector installations; and other alternatives like J.D. Edwards and SAP. The County has direct experience operating Oracle and PeopleSoft.

In considering the replacement process, serious consideration should be given to packages that County employees are already familiar with in terms of functionality. For this reason, Oracle and/or PeopleSoft appear to offer some distinct advantages in that they represent familiar technologies to some County agencies and staff. In the short term, these systems offer three key benefits: (1) shorter implementation time, (2) reduced need for training, and (3) increased report availability. Over the long term, familiar systems are apt to be more heavily utilized during the first several years, given the existing knowledge base throughout the County. These benefits will directly reduce the time and costs associated with implementation and ongoing systems utilization.

BUSINESS CASE

Implementing an enterprise system carries the promise of having information entered one time, into one common repository, so that it is available for use across the various functions of an organization. Enterprise systems provide multiple benefits, summarized below from a case study of Landec Foods[33]:

- Improved information exchange
- Reduced financial reporting cycles
- Ability to identify recovery costs for services provided
- Ensuring performance of supplier contracts for goods and services
- More accurate information
- Consolidated operations
- Better coordination and efficiencies

Other enterprise implementation success stories include Dell Computer and PHH Arval, a vehicle fleet leasing and management company. According to an article in *Darwin* magazine, "Putting Two and Two Together,"[34] these companies have been able to optimize resources, control expenses, cut costs, and increase productivity.

These representative examples point out the benefits that many are hoping to achieve with an ERP integration strategy. According to a January 2002 survey of 350 IT professionals conducted by InformationWeek/Morgan Stanley, consolidation and integration are common themes in today's business and IT world: "Fifty-five percent of companies are reducing the number of applications they're running … More than a third are switching to off-the-shelf applications and nearly 20% are rewriting the applications they have. Half of those surveyed are deploying or plan to deploy enterprise resource planning applications this year. Of those, more than 40% plan to increase the number of ERP applications they use."[35]

The enterprise business case supports moving forward with replacement of financial and HR/Payroll systems. This strategy specifically addresses one of the four deficiencies related to King County identified in Governing.com's Government Performance Project 2001, related to the County's failed ERP system implementation. The business case supporting implementation of one combined and integrated system is reasonably strong and is based on consideration of quantitative and qualitative factors, and the alternative's status as a long-term proposition. Financial payback is expected to be realized only if the County aggressively reinvents itself. This will be no easy task.

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[33] "Landec Food Subsidiary Completes Implementation of Business System Realizing Improved Efficiencies," *PR Newswire* (Jan. 8, 2002).

[34] "Putting Two and Two Together," *Darwin* 2 (No. 1, January, 2002): 30—36.

[35] Steve Konicki, "With Applications, Less Is More," *InformationWeek* (February 4, 2002): 45.

Achieving payback is reliant on the following conditions:

- Agreeing upon one way of doing things — standardizing, streamlining, and simplifying processes
- Integrating currently disparate databases to provide timely and accurate reporting, thus positioning management to make better business decisions
- Operating and maintaining a standard architecture
- Building adjunct systems for query and reporting purposes
- Implementing successfully through strong project management
- Getting agency personnel to operate as a team
- Training employees on one set of technologies
- Ultimately reducing number of staff involved in core support

If the County is unable to substantially deliver on these factors, the timeline for payback will be pushed so far out as to be inconsequential. As is, payback will not likely be achieved until at least 10 years out. A detailed cost/benefit feasibility study should be conducted to validate these statements.

There are two ways the County could achieve financial payback in the shortest time frame. Both will be difficult to achieve and involve staff reductions. The first is through direct reorganization of personnel. The scenario may be achievable if the County reorganizes its financial, HR, and procurement functions. This scenario would be accomplished through centralization whereby one group would support the enterprise instead of many. The second is related to the first; by simplifying business practices and workflow, all end-users who utilize the systems stand to gain efficiencies through reduced efforts and streamlined workflow. Although process reengineering will be required to successfully implement any system, the process may be used to further reduce the number of staff around the enterprise through simplified business processes, requiring significantly less time and effort to process information. The difficulty in either scenario is significant. Staff are anticipated to resist the change in workflow.

The costs of implementation are expensive. The 2001 Dye Management Report estimated that a new ERP system would cost in the range of $40.9 million in capital costs. When costs are totaled for current pricing and additional resources are added for up-front workflow analysis, internal staffing, training, and maintenance, costs could total in the range of $55 to $60 million. The exact costs will be dependent on information requirements that need to be updated and agreed to, and the actual configuration implemented with reengineered processes. Costs are roughly estimated during this planning study, but will be more accurately calculated when a system is selected, a contract negotiated, and a detailed implementation plan is developed.

Related Technology Needs:
- Data Management
- Financial Systems
- Human Resource/Payroll Systems
- Legacy Systems
- Improved Integration Between Systems
- Upgrade and Replace Dated Systems

Related Business Goals/Objectives/ Directions/Opportunities:
- Manage Data and Information
- Implement Technology Initiatives
- Improve Processes
- Integrate and Establish Partnerships

Related Deficiencies:
- Significant time is spent reconciling data between the four systems.
- Numerous additional stand-alone databases have been developed for tracking data that are not maintained in the separate systems
- Departments report information differently depending on what system is used.
- OHRM lacks ownership of the human resource data and has very limited confidence in its ability to produce accurate reports.
- The current PeopleSoft system does not perform labor distribution at the level required.
- Neither HR/Payroll system supports the desired payment cycle without significant reconfiguration.
- Workarounds to overcome shortcomings in MSA have created inconsistent and inaccurate data.
- Documentation for modifications to the systems is lacking.

Costs:		
Low	Moderate	**High**

Payback:		
Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Simplify County workflow												
a. Identify and document current processes	▓	▓	▓	▓								
b. Define issues to be resolved	▓	▓	▓	▓								
c. Identify and analyze options		▓	▓	▓								
d. Discuss/select new processes		▓	▓	▓								
2. Upgrade current IBIS, PeopleSoft, and MSA versions (only as required in short term with negotiated price reductions)												
a. Install				▓	▓							
b. Convert data				▓	▓							
c. Reconfigure systems				▓	▓							
d. Test					▓	▓						
e. Train						▓	▓					
f. Go live						▓	▓					
3. Define detailed enterprise needs												
a. Define detailed requirements		▓	▓	▓								
b. Discuss			▓	▓								
c. Document			▓	▓								
4. Conduct procurement process				▓	▓							
5. Select systems					▓	▓						
6. Implement (in phases)						▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	850,000	17,770,000	8,270,000
Operations:		100,000	2,400,000
Total:	850,000	17,870,000	10,670,000

Capital Costs: Associated with implementation through Year 4.
Operations Costs: Continue annually indefinitely.

OUTCOME MEASUREMENT

- Requirements defined and agreed to by agencies
- Reengineered business processes with changes implemented
- Successfully implemented integrated systems
- All employees using one type of software
- Satisfied end-users
- Lower total cost of ownership

D. *Management and Organization*

Five strategies have been developed to address the County's technology management and organization. The strategies specifically address accountability, planning, project management, reorganization, and training. Related to management and organization strategy development weaknesses of particular concern include lack of the following:

- Formal performance measurement, which hinders agencies from knowing where plans, initiatives, projects, and budgets stand during implementation and afterwards.
- Designs and plans to guide personnel in development, implementation, and deployment activities.
- Project management capabilities.
- Centralized, coordinated organization structure supporting enterprise functions and technologies.
- Leadership, analytical, and project management skills focusing on the "business side" of technology deployment.

D1. Institutionalize performance measurement for technology.

Performance measurement provides a direct means of knowing whether goals and objectives are being met through tracking and monitoring mechanisms. A tracking framework will directly tie County business strategies and goals to corresponding actions, and then measure the outcomes of such actions. As the County becomes more results oriented and particularly focused on stakeholder delivery, performance measurement will need to be defined for service delivery, operations, architecture,

Timing: PHASE ONE	Difficulty: LOW
− Requires a new way of results-oriented thinking.	
− Will reshape resource allocation over time to directly achieve improved performance.	
− New function requires ongoing monitoring resources.	
− New framework implementation requires time to refine and influence planning.	
− Measurement system may intimidate agencies' personnel in short term until used to it.	

management and organization, and funding functions. A broad-based technology performance-measurement framework should be developed to help ensure that plans are carried out, and through time, ensure that proper plans are put into place.

Performance measures may be used to measure results from the top to the bottom of the organization. Such measures will track what progress is being achieved pertaining to King County's strategic plans. While drilling down into the agency's domain, performance measures will also track progress made toward implementing agency business plans and the associated technologies to support such plans. Related to specific projects, performance measures will provide a means to track whether specific technologies are deployed on time, on budget, and in a viable manner. The County has already begun establishing a performance measurement framework related to technology. This framework is discussed in the Appendix to this plan including both processes and the premises behind outcome measurement.

BUSINESS CASE

Unlike previous "measurement" tools used in the marketplace such as management by objectives (MBO), performance measurement is not going away. During the 1980s and 1990s citizen concern for public accountability became so strong that the federal government passed the Government Performance and Results Act in 1993, requiring federal agencies to document the outcomes and benefits of their services.[36] This effort has grown to include state and municipal governments. "Mayors, council members, general citizens, and municipal administrators want to know how to judge the service delivery performance of their local government." Cities cited as models for this process include Charlotte, North Carolina; Sunnyvale and Palo Alto, California; Phoenix, Arizona; Dayton, Ohio; and Dallas, Texas.[37]

The County is well positioned to benefit from institutionalizing performance measurement. The hard dollars associated with setup are minimal, and costs may generally be absorbed into everyday measurement and reporting activities. In contrast to the costs involved, the benefits are more significant. The driving premises behind using measurement systems are twofold. First, performance measurement systems prompt personnel to be more accountable and perform at higher levels than would otherwise occur if measurement systems were not in place. End users then benefit through higher quality systems and service delivery. Second, and just as important, when technology performance problems are occurring, they can be found and corrected right away.

A performance measurement framework should be developed immediately for use in 2003 and beyond. The hard costs associated with developing a framework are at most moderate. Time from County managers from the BMC/TMB is a requirement. A secondary cost will come in the form of a facilitative process should the County not be positioned to do this on its own. Benefits from deploying a framework will be achieved in the near term. Specific measurements may be obtained and used to make go/no-go decisions, determine whether resources have been effectively expended, redirect efforts as required, help prioritize initiatives, align with change management, and provide feedback into future planning decisions.

The return on implementing performance measurement is easy to see. As reported in "The Graziadio Business Report," workforce surveys indicate that people believe they could improve their own job performance by 15 to 20 percent but that no one would recognize the improvement. Such improvement could have a tremendous impact on productivity and cost savings. It is also predictable that systems and work processes could be improved through measurement tools. The performance gap between current staff and system productivity and potential productivity can be closed through measurement, tracking, recognition, involvement, and evaluation.[38] All of these activities are relevant to institutionalizing technology performance measurement and will serve the County well.

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[36] J. Theurer, "Seven Pitfalls to Avoid When Establishing Performance Measures," *Public Management* (1998).

[37] D. N. Ammons, "Municipal Benchmarks: Assessing Local Performance and Establishing Community Standards," (1996).

[38] Charles D. Kerns, "Maximize Business Achievement," *The Graziadio Business Report* (2002).

Related Technology Needs:	Related Business Goals/Objectives/Directions/Opportunities:	Related Deficiencies:
• Proactive Service Delivery • Help Desk Support • End-User Training • Service-Level Commitments • Standards • Strengthened Leadership and Management • Staff Retention • Agency Coordination	• Improve/Expand Services • Empower Employees • Manage Data and Information • Optimize Analysis, Assessment, and Improvement Practices • Establish Communication and Collaboration • Define Metrics and Performance Measures • Strengthen Project Management • Increase Revenues and Control Costs	• There is limited reporting available to track and measure performance. • Business analysis is not performed across agencies where it could be used to promote cross-agency system efficiencies. • Few service-level agreements exist across the country. • ITS services have not always been available on a timely basis.

Costs:				Payback:		
Low	Moderate	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define key operations and delivery areas requiring measures	██											
2. Define potential performance approach/metrics	██	██										
3. Develop performance metrics	██	██	██									
4. Align with business plans	██	██										
5. Select/Approve metrics		██	██									
6. Implement measurement process			██	██	██	██	██	██	██	██	██	██

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	Costs will be absorbed internally.		
Total:			

OUTCOME MEASUREMENT

- Defined measures
- Use in annual planning efforts
- Corresponding changes occurring as a result of measurement
- Mechanism put into place to monitor progress, change activities
- Resource utilization/productivity
- Quality of service
- Customer responsiveness

D2. Develop technology design/plans for significant initiatives and projects.

The purpose of the County's strategic technology plan is to provide direction to the various parties involved in developing and deploying technology. This plan does this through an established vision, defined strategies, and preliminary transition plans.

However, long-range directions at the County must align with day-to-day technology operations. Currently, this link between strategies and tactical activities is largely missing. While several current

Timing: PHASE ONE	Difficulty: LOW-MODERATE
– Must be defined as a mandatory County requirement in particular circumstances. – Requires alignment with architecture. – Significant projects require some coordination with enterprise initiatives. – Limited resources available within County today to develop such plans (in terms of time and expertise). – Planning has often been viewed as an unnecessary administrative function.	

technology plans exist (Sheriff's Department [1/02], Transit [12/98], and Waste Water Treatment [1/02]), most agencies lack the detail that connects business plans to tactical actions and interagency initiatives. Consequently, there is little formal definition of technology at a project level, and a lack of prioritized actions, staffing assignments, and allocated funding. While agencies develop annual business and program budgets in due course, these budgets lack depth in terms of defined technology resource planning and allocation. More detail is required, especially in the areas of architectural design, resource deployment, and cost justification. Detailed technology designs/plans are needed in a number of technology areas at the County including the following:

- Broadband (including VoIP)
- Integration
- Web deployment
- Database architecture (including warehousing)
- Human Resources/Payroll implementation
- Financial system implementation
- Project/system upgrades (e.g., IBIS, MSA, and PeopleSoft, as required)
- Telephony (including voice-messaging integration)
- Workflow redesign
- Network security
- Law, Safety, and Justice system

The County should not proceed with any significant initiatives, projects, or major expenditures without proper plans in place. There will be a need to align this and future strategic technology plans with agency business plans on a continuous basis.

BUSINESS CASE

In the County's case, the lack of plans has meant two things. The first is a lack of progress. The County has been at a standstill on many initiatives and is now behind in delivery relative to many of its peers in areas such as Web integration and data management. Second, for technologies that have been deployed, the lack of plans has resulted in numerous ineffective systems. Systems suffering from a lack of front-end planning/design include Financials, Human Resources/Payroll, and Law, Safety, and Justice, to name a few.

Planning at the design and task levels will provide a much-needed blueprint to help guide those responsible for technology deployment. Without such plans, no firm costs or schedules are available. For major initiatives, systems, and/or projects, planning is considered to be an essential requirement before implementation begins. Without planning, the County's architecture is at risk of being assembled improperly and/or inefficiently. Required planning components include the following:

- Requirements
- Specifications
- Overall design
- Integration

- Schedules
- Resource allocation
- Assignments
- Budgets

Planning in each of the identified areas is expected to reap significant payback. Further, when individual plans are compared side by side, they may be prioritized in terms of resource allocation and deployment. Based upon Moss Adams's experience, solid project planning and design can save the County up to 20 percent of the time/resources required to build and deploy new technology. The cost of developing plans will vary widely, as each is dependent on different circumstances.

As Radha Pillai, of United Way of New York City, writes in regard to not-for-profit agencies, "Long-range and strategic planning are necessary for all agencies. Such planning enables agencies to prioritize and concentrate their efforts in order to reach their goals quickly and effectively. Unfortunately, many organizations fail to include technology as part of the planning process. The quality and efficiency of services provided by an agency often depend highly on the technological capacity of the organization."[39] This is true across virtually all organizations. There are a number of benefits to technology planning, including the following:

- Enabling effective and efficient use of technology: Enables planners to efficiently plan technology expenditures based on prioritized needs.
- Ensuring that the right components are purchased: Coordinates needs and helps to identify the correct hardware and software needs and prevents errant purchases.
- Reducing costs: Enables the organization to review and identify solutions that will meet the organization's needs at least cost.

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[39] Radha Pillai, "Developing a Technology Plan: Key to Getting Needed Funds," *Tech News*.

- Guarding against crisis situations: Avoiding poor decisions through planning helps to prevent emergencies.
- Utilizing staff time optimally: Helps to optimize use of resources and streamlines staff use.
- Protecting against staff turnover: Protects the organization from instances of staff turnover by documenting needs and strategies as well as existing systems.
- Securing funding: Allows definition of need for funding, thereby increasing the likelihood that needed technologies/projects will be funded.

To achieve these benefits, an effective technology plan must be developed in stages. Each project is expected to have these components. The following steps indicate what, at a minimum, should be involved:

- Establish leadership and support: Attain leadership buy-in and establish a technology team.
- Assess the organization's systems: Determine what technology is in place, what is working, and what is not.
- Define organization's technology needs: Identify technology needs based on business drivers.
- Explore potential solution: Assess the "gap" between current systems and needs and then identify and review solutions.
- Develop technology plans: Document resources, identifying needs, solutions, and required funding.
- Pursue funding: Utilize technology plan as basis for needed funding.
- Implement the plan: After attaining funding and establishing a timeline and responsibilities, proceed with implementation of the plan.

In summary, the business case supporting the design/planning process is strong. Arguments may be made for requiring plans on all significant projects and designs for all major technologies and systems. Properly developed plans and designs are assumed to recover development costs directly through increases in personnel efficiency, enhanced resource allocation, and cost avoidance related to avoiding mistakes that would otherwise be made if proper planning efforts were not undertaken.

Related Technology Needs:
- Unattended Business Functions
- Standards
- Data Management
- Planning and Design
- Hardware Standards
- Upgrade and Replace Dated Systems
- Strengthened Leadership and Management

Related Business Goals/Objectives/ Directions/Opportunities:
- Improve/Expand Services
- Manage Data and Information
- Optimize Analysis, Assessment, and Improvement Practices
- Strengthen Project Management
- Reorganize and Restructure
- Improve Processes
- Utilize Planning Activities

Related Deficiencies:
- Both strategic and tactical plans are lacking.
- Staff are not well trained to conduct planning.
- CX agencies are the least likely to plan on a regular basis.
- There is no strategic framework in place for directing and unifying GIS efforts.
- The result of not planning has a threefold impact. First, when maintenance is needed, funds are not always available. Second, when costs are incurred, they are often higher than they should be. Third, computer assets are sometimes neglected.
- Occasionally technology was referenced within plans, but the analysis was usually limited.
- Overall, the linkage between available business and technology plans is lacking.
- There is a lack of strategic planning.
- There is no "Countywide" plan to address security.

Costs:

Low	Moderate	High

Payback:

Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Develop planning framework	■	■										
2. Obtain BMC/TMB support and buy off	■	■										
3. Identify and discuss needs for plans/designs	■	■										
4. Acquire/assign project managers	■	■										
5. Schedule activities/projects	■	■										
6. Conduct planning/designs (according to needs and alternatives analysis)		■	■	■	■	■	■	■	■	■	■	■

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	Costs will be absorbed internally.		
Total:			

OUTCOME MEASUREMENT

- Planning framework developed for County and endorsed by agency directors
- Plans used as a roadmap to guide efforts, projects, implementations, etc.
- Planning guidelines
- Priority listing of plans to be developed
- Schedule for development of plans
- Number of plans created
- Update/review schedule established

D3. Establish a comprehensive project management methodology.

Strong project management requires leadership and structure to ensure that a successful outcome is achieved. With strong project management, the County can position itself to deliver on commitments and properly execute plans. The County currently lacks extensive resources to support strong project management; specifically training, methodologies, and, most important, highly experienced managers are in short supply. Without strong project management, the

Timing: PHASE ONE	Difficulty: MODERATE

– The easy part of developing a program will be defining methodologies.

– Additional expertise will need to come from outside the County; otherwise, project management expertise will take time to learn.

– Not all interested personnel will be a good match with their skills.

– The pool of managers available today is less than needed for the pending workload.

likelihood of implementation difficulties increases as does the potential for project failure. This is especially true for very large or complex projects. Project management should be recognized as particularly important as the County gears up to deal with new major technology initiatives.

A fundamental component of the County's project-management program includes the already established Project Review Board (PRB). The role the PRB provides is one of quality assurance through review of new and in-progress projects at predefined milestones where key outcomes are expected. The Board's activities are structured to directly influence how project management is conducted within the County. When the reporting process is followed, it will naturally increase accountability. Progress reports are expected to be provided by the sponsoring agency's director, and potentially from the project management team. Milestone reporting will ultimately provide the County with the ability to redirect a project if it is required. The Board's work is considered vital to the future of the County's overall project-management program, and as such, should be expanded to monitor progress on all major projects.

One of the key benefits provided by the PRB process is to force development of needed plans and designs and to identify needed resources. The process provides an initial framework for project managers to follow for any sizeable project. For project-management purposes, the process may be used as a foundation to anchor early planning as well as providing a path to follow to keep project(s) on track.

The responsibilities of project management remain, appropriately, with those who are in charge on a daily basis. Currently, project managers are assigned throughout the County to manage a continuous stream of development and implementation activities. While managers are providing basic levels of direction, the processes followed often lack the structure necessary to ensure consistently high levels of performance. As part of a project, managers typically define tasks, schedules, budgets, and deliverables. These components are at the core of any program. However, the County is missing an extended tool kit that will advance the state of the County's project management program. Specific components of such a tool kit include processes for the following:

- Continuous executive management sponsorship and involvement
- Problem resolution
- Intra-agency oversight, review, and reporting (with go/no-go milestones)
- Involvement of end-users throughout the project
- Ongoing risk assessment
- Standard methodology

Strengthening project management will be a comprehensive endeavor. The process will consume multiple years and touch every agency. To strengthen capabilities, a multifaceted program is required. Near term, the County should focus on establishing new methodologies along with providing training to personnel. Essential elements in any methodology will include regular communications, active stakeholder involvement, ongoing analysis, and multilevel reporting. The associated training curriculum should focus on fundamentals. As required, training should be supplemented with coaching. Long term, the County should build up a critical mass of project managers, providing seasoned talent to share across agency boundaries. ITS should establish a pool of managers to support their own and other agencies' projects. Larger agencies may also desire to establish their own project management capabilities. For the largest of projects, a team of managers may be appropriate in order to deal with the many facets of governance, sponsorship, and technical oversight.

BUSINESS CASE

There should be little debate as to the need for strengthened project management. With an anticipated $50-$100 million in projects underway and pending, a solid program will be needed to optimize the County's investments in technology. The benefits of a project-management program are directly tied to increasing the potential of success. Project management will increase the likelihood of projects being completed on time, on budget, and achieving the intended outcomes. The benefits of management will directly improve financial performance, and also help ensure that those projects with planned financial payback are able to deliver on that promise. The costs of implementing a strengthened project-management program are tied primarily to training and the time involved to execute the program.

According to a white paper written by Steve Crago of the University of Southern California's Information Sciences Institute, "A project is defined as a temporary endeavor undertaken to create a unique service." In this endeavor, project management involves balancing competing demands among scope, time, cost and quality; stakeholders with differing needs and expectations; and identified requirements (needs) and unidentified requirements (expectations).[40] According to Standish Group, a consulting firm in West Yarmouth, Massachusetts, "28% of all IT projects are cancelled before completion, and an additional 46% are behind schedule or over budget."[41] Analysis indicates that the primary reason for failure of the projects was poor or insufficient project management.

An example of a recent success in project management may be seen at the R. R. Donnelly & Sons Co. in Chicago, which recently migrated its 18,000 worldwide e-mail users onto a single e-mail system. The migration replaced eight major e-mail systems and included new hardware, new network architecture, and newly centralized e-mail management. Despite hitting the usual unforeseen obstacles and detours, the e-mail migration project was completed six months early and under budget. Gary Sutula, Donnelly's CIO, defined the critical factors involved for keeping the project on track:

- Personnel — The right people, whether internal or external. Personnel must have the right skills and expertise required for the particular project.
- Plans — Project plans, including schedules, tasks, and responsibilities, and budgets with each project team member accountable for their specific issues.
- Results — Project focus on the overall organization, not on departments or individuals. Success depended on cooperation from throughout the group, regardless of potential political resistance.

Clearly, project management is often the differentiating factor between those projects that successfully improve technology in a cost-effective manner and those that either fail to improve systems or do so at unforeseen and politically damaging costs. The benefits of project management are worth the effort. Implementing a solid project-management scheme properly will require an upfront investment in training and tools so that project managers can approach the task in an effective and consistent manner.

Related Technology Needs:	Related Business Goals/Objectives/ Directions/Opportunities:	Related Deficiencies:
• Unattended Business Functions • Standards • Planning and Design • Strengthened Leadership and Management	• Improve/Expand Services • Empower Employees • Establish Communication and Collaboration • Define Metrics and Performance Measures • Strengthen Project Management • Increase Revenues and Control Costs	• An advanced project management framework is not in place; standards are lacking. • Project management and analytical skills are lacking. • Agency groups lack coordination. • Both strategic and tactical plans are lacking.

[40] Steve Crago Ph.D., "Management by Projects," University of Southern California, Information Sciences Institute-East (August 17, 2000).

[41] *Information Week Magazine,* data excerpted from "The Chaos Report," produced by the Standish Group (November 30, 1998).

Costs:				Payback:		
Low	Moderate	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Develop project management methodology	▓	▓	▓									
2. Define basic requirements for managers		▓	▓									
3. Obtain buyoff from BMC/TMB		▓										
4. Develop training program and deliver			▓	▓	▓	▓						
5. Deploy new project-management framework			▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	150,000		
Operations:			
Total:	150,000		

Capital Costs: Associated with developing a methodology.

OUTCOME MEASUREMENT

- Definition of project-management approach and methodology
- Plans in place before projects begin
- Number of successful projects completed on time and on budget
- Adherence to agreed upon approach
- Scaling of methodologies to the size, scope, and complexity of the project
- Number of projects delivering predefined deliverables and results

D4. Reorganize technology functions around the County.

Currently, the County operates several technology groups located in various agencies. These groups are operating within ITS, DNR, Public Health, Transportation, and Finance, among others. The organizations have evolved over many years' time in parallel to specific agencies' business models. The groups have little coordination between them and, as such, perform redundant functions including programming, report development, network and server administration, and applications support.

Timing: PHASE THREE	Difficulty: HIGH

- Significant process change is required.
- Management shake-up may be inevitable.
- Some potential financial impact may occur short term.
- There is risk of temporary chaos without strong management.
- Cultural resistance is expected.
- Uncertainty, confusion, and frustration may be anticipated near term if staff realignment occurs.

There is some opportunity available to strengthen coordination between these groups. One of the most direct ways is through a reorganization process. The overall goal of this strategy is to operate more efficiently. This goal may be accomplished through more centralized management and control, which in turn will strengthen planning and resource allocation. The concept behind reorganization is to move the County more toward a centralized business model. This means that some functions that are currently

decentralized will move out from under individual agency oversight into a more centralized structure where the above-mentioned benefits may be realized.

At a minimum, arguments may be made for centralizing enterprise functions, some of which are handled by decentralized agency IT groups. This means that telephony, wide area network, data resource management, asset management, Web services, local area networks, desktop support, and HR/Payroll and Financial applications would be managed under one central responsible authority. Presently, such functions are managed in a hybrid manner, with some administration occurring centrally and some decentrally in agency-controlled environments.

This strategy does not suggest that agencies are performing poorly in these areas. Rather, it recognizes the potential for increased synergy of these efforts if County managers work together to allocate resources in a more coordinated fashion. As it stands now, individual agencies are not positioned to share resources or manage in such a manner to move resources around on an enterprise scale and against a backdrop of 10,000 end-users. Reorganization holds the promise of enabling the necessary resource sharing as well as the possibility of eliminating duplication and overlapping efforts. Table 41 identifies how enterprise functions are currently being managed.

Table 41: Current Split of Enterprise Technology Functions

Function	Centralized	Decentralized
Telecommunications	Enterprise (PBX, Centrex)	Switches, routers, PBXs, handsets
Voice Messaging	Enterprise	Not applicable
E-mail	Enterprise	Not applicable
Network	WAN/I-NET/LANs	LANs/desktop support
Facilities	Central data center	Multiple data centers
Financial – HR/Payroll Systems	Shared functions	Shared functions
Help Desk/Support	Enterprise help desk	Agency help desks/desktop support

To support the proposed reorganization, formal ties between agency managers will need to be strengthened to increase the quality and speed of technology delivered to end-users. Stronger ties should come in the form of managerial alignment, plans, defined group responsibilities, and ongoing coordination, communications, and progress reporting. A skills inventory related to identifying both managerial and staff capabilities will support this process. Further, outsourcing should also be assessed during the reorganization process. Potential opportunities that should be examined for outsourcing including the help desk, applications support, development, data center, PC maintenance, and network management functions.

The process of reorganization will impact ITS and all other agencies with established technology functions. In total, up to roughly 300 personnel could be affected, including some possible staff reductions. How the reorganization actually occurs will depend upon needs and assigned reporting relationships.

The end result of reorganization will be a newly reconstituted central services department. This department will be an expanded version of what exists today at ITS. In concept, agencies' staff involved in enterprise functions would transfer to the new central services department. This is not to say that any physical moves will be necessary. Rather, changes will be made through modified reporting relationships, assigned responsibilities, number and location of end-users served, specialization, and team service delivery.

It must be recognized that numerous agency functions may be best left in decentralized agency environments. Key among these is specialized application support. An example of the need for specialization is found in Transit's Management Information and Transit Technology Group. To maintain current high levels of responsiveness and connections with end-users, strong arguments may be made to leave such application groups intact and managed as they are presently.

A final alignment at the top of the organization is also in order. The CIO function has already been structured to provide leadership at the County. As such, the CIO's efforts should focus on strategy development, establishing policy, and leading governance efforts at the Council, Executive, SAC, and BMC levels. The day-to-day leadership and management should appropriately be left to the manager in charge of the various technology groups remaining within the agencies. As part of this alignment, the CIO position could be moved out from OIRM and a separate OIRM Director assigned. This move will reinforce the CIO's position as a leader over all technology groups at the County. A separate office for the CIO may be established. Meanwhile, OIRM should continue its efforts in providing oversight, analysis, and planning. The OIRM, CIO, and newly reconfigured central services department could be colocated to capitalize on further synergies that may develop. Lastly ITS should be renamed if the reorganization takes place, to obtain a fresh start.

BUSINESS CASE

Summary benefits of reorganization will provide advantages in terms of efficiency and effectiveness. From an efficiency standpoint, fewer resources may be needed Countywide. From an effectiveness standpoint, technology will be deployed, operated, maintained, and serviced at a higher level of performance because of tighter coordination between personnel, planning efforts, aligned schedules, and strengthened resource allocation. One of the primary intents of reorganization will be to reduce IT management costs across the County. This is an attainable goal for technology staff supporting Countywide functions should the County aggressively pursue reorganization. In a reorganization, the bottom-line benefit will be a more effective business model — strengthening alignment of the County's technology investments to meet both citizen and intra-County business needs.

The business case supporting this strategy is dependent on reorganizing technology positions. There are approximately 178 staff in ITS, and outside of ITS another 150 staff operate to support technology. The currently established organizations have promoted some redundancies and inefficiencies in their technology operations, and many functions are expected to be better managed through a reorganization. These include the help desk, Web development, training, data management, applications support, integration services, and business analysis. By maximizing efficiency and minimizing overlap, it is estimated that centralization may reduce/reallocate a number of these personnel Countywide. It is worth noting that decentralized operators may be reluctant to give up their autonomy. Arguments supporting the status quo are usually tied to the need for flexibility, increased responsiveness, and ability to meet their unique needs.

Reorganization may also improve responsiveness by balancing on-call staff levels to ensure continuous support. Continuous support is a challenge for smaller agencies with limited budgets. Grouping staff will result in a pooling of knowledge that increases the likelihood of an immediately successful response. Grouping staff who share common service areas may also increase their collective knowledge through increased peer communications, training, and mentoring. Direct benefits of this approach include the following:

- Reduced function redundancy
- Improved retention and recruitment
- Consistent distribution of desktop technology, enabling better enterprise support
- 24x7 support being easier to provide (e.g., to smaller agencies)
- Faster problem solving
- Increased potential career planning and opportunities
- Knowledge transfer between personnel
- Increased training opportunities
- Improved standard setting (e.g., Win 2000 implementation because of Active Directory and Messaging functions)
- Improved license management for broadly used products (e.g., Oracle, Microsoft, antivirus software)

In industry, reorganization through centralization has enabled many organizations to realize the same benefits, including lower budgets, reduced attrition, and improved quality of service. For example —

- The state governments of New Jersey, South Carolina, Pennsylvania, and Missouri have all recently undertaken substantial consolidation projects that have considerably simplified management of those governments' data. Pointing out cost savings as well as staff retention issues, these states are seeking to eliminate redundant data and operations centers. "The effect of consolidation can be significant. Most governments are projecting multimillion-dollar savings, greater operating efficiency, more opportunities to launch new IT projects, and, in some cases, a centralization of independent applications."[42]

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[42] http://www.govtech.net/magazine/gt/1999/jan/datacenter/datacenter.phtml

- United Space Alliance of Houston, prime contractor for NASA, was able to consolidate operations that led to a staff reduction of 17 percent. Most of these savings were realized by reducing the number of help desks and avoiding redundancy of duties; providing network support from one or two central locations also allowed for greater knowledge sharing and reduced troubleshooting times.

- Limited Technology Services, an IT business supporting the retail industry, realized the benefits of consolidation through a more structured, leaner, and more organized department, resulting in a cut of attrition rates by 50 percent. The centralized business model resulted in clearly defined roles and responsibilities of staff, eliminating the costly and inefficient "jack of all trades" positions that existed in smaller offices.

- Consolidated Natural Gas (CNG) established a more centralized structure that ensured a successful conversion to SAP since the implementation of the package in a decentralized model would have significantly increased the risk and expected costs. Simply put, CNG believes the existence of a single technology department with responsibility over the technology was the only way for such a large-scale ERP implementation to be brought to its successful conclusion.[43]

The summary arguments supporting reorganization through centralization are numerous. Centralization promotes standardization, which is often the most cost-effective way to run the business; requires one set of resources — not many; provides for synergies and economies of scale among the shared set of users; often provides a simpler environment to manage; and may directly save costs through efficiencies attained and described above. However, centralization also has some disadvantages. Chief among these are a "one-size-fits-all" mentality, whereby unique agency requirements may not be met; potential for increased bureaucracy and sometimes too much control versus a needed "close-to-the user" customer service mentality; and a lack of a strong track record for reliably delivered services at central sites.

While the costs of consolidation are short term, expenditures supporting the move may be significant. Reorganization may cost the County significant money depending on whether personnel are shifted. Regardless, the net benefits of a reorganization are assumed to be positive, particularly if cost cutting is part of the effort.

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[43] *CIO Magazine* (September 15, 2001). Available online at http://www.cio.com/archive/091501/centralization.html

Related Technology Needs:
- Unattended Business Functions
- Standards
- Data Management
- Planning and Design
- Document Management

Related Business Goals/Objectives/Directions/Opportunities:
- Manage Data and Information
- Improve Processes
- Increase Revenues and Control Costs
- Reorganize and Restructure
- Utilize Cost-Reducing Technologies

Related Deficiencies:
- There is a lack of enterprisewide coordination.
- Focus has been on maintaining status quo.
- Staffing levels appear stretched.
- Agency groups lack coordination.
- Some agencies are frustrated and resisting the new level of oversight.
- Because agencies have evolved independently, there is some overlap in services being provided.
- Very little top-down planning has occurred within the County to establish an optimum organizational model balancing what is delivered centrally and decentrally.

Costs:				Payback:		
Low	**Moderate**	High		Low	Moderate	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Inventory technology personnel skills			▓	▓								
2. Assess skills			▓	▓	▓							
3. Meet with agency executive management				▓	▓							
4. Build consensus/support for change				▓	▓							
5. Identify alternative organizational structures				▓	▓							
6. Conduct alternative cost/benefit analysis				▓	▓	▓						
7. Select/agree to a structure/announce					▓	▓						
8. Develop new position descriptions/SOPs as required					▓	▓						
9. Develop a detailed physical consolidation plan (as required)					▓	▓						
10. Reorganize County IT/conduct change management process						▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:	500,000		
Operations:			
Total:	500,000		

Capital Costs: Associated with an organizational study.

OUTCOME MEASUREMENT

- Skills inventory
- Cost/Benefit analysis
- Selected new structure
- Improved managerial alignment and communication
- Productivity levels
- Cost of operations

D5. Strengthen technology management and delivery capabilities through specialized training.

During the strategic planning study it became apparent that County technology personnel lack skills in several key areas including leadership, analysis, and project management. While many personnel have strong technical skills, they lack expertise related to "managing" technology particularly in the area of change management. The three areas of leadership, analysis, and project management are especially important for the County to successfully work through its transition process.

Timing: PHASE ONE	Difficulty: MODERATE-HIGH

– This is a multiyear process, especially if focused on training current personnel (rather than hiring).

– Some business skills are challenging to teach/attain.

– Funding is required.

– Requires clear understanding of individual weaknesses and targeting training/coaching to address.

The first area of need pertains to leadership. Throughout the 1990s technology leadership within the County has not kept pace with the needs of the $2 billion, 15,000-person organization. The leadership issue came to a head with the partial failure of the ERP implementation in 1999. Since that time a fair amount of change has occurred, including (1) hiring of a new Chief Information Officer (CIO), (2) establishment of the Office of Information Resource Management (OIRM), (3) development of a new governance process, and (4) hiring of multiple new technology managers within the agencies. Through this process technology leadership has begun to change from the top down, but however solid the structure may be at the top, the recent changes in leadership are not enough to spur change throughout the whole organization. The change in leadership needs to continue. At this point, attention should be directed to those who are managing agencies' technology units down to the supervisor level. Training will be instrumental to continuing the change process. Needs-driven leadership training will address (1) staying focused on the business; (2) influencing peers, direct reports, and other employees; (3) managing change toward best practices; (4) developing and managing against budgets; (5) decision making related to outsourcing; (6) enhancing vendor selection and management; (7) building a technical team; (8) measuring performance; (9) managing for quality; (10) balancing enterprise vs. agency needs; (11) utilizing virtual teams; (12) facilitating team-based decision making; (13) managing customer expectations; and (14) communicating effectively.

The second area of need relates to analysis. The assessment portion of this study recognized that personnel tend to know their jobs well technically, particularly related to daily systems operations. These same personnel, however, often do not have extensive training in business analysis, leaving the organization rich in technical know-how, but lacking in knowledge of when and how best to use it. Important business decisions are being made daily related to technology. Examples include vendor and product selection, systems design, and application prioritization. However, while current systems are kept operational, the challenging "big picture" business issues related to technology often go unnoticed and/or unresolved. Further, the same individuals who are chartered with maintaining systems are also responsible for making critical cost/benefit decisions that will impact agency efforts for years to come. Business analysis skills are needed within agencies down to the lead level. Analytical training will include how to (1) gather, assess, and document requirements; (2) perform feasibility analysis; (3) conduct risk assessments; (4) evaluate alternatives; (5) apply various decision-making techniques; (6) survey for critical issues; (7) phase development and implementation; and (8) construct cost-effective architecture.

The last area of need pertains to project management. There are dozens of active projects at the County being worked on at any given time. The projects are important to the County in terms of the business needs. Particularly challenging are projects that are implementing a change to Web-based architecture, which in turn demands a fundamental change in business processes. For any project manager facing this double challenge of implementing new technologies while at the same time managing change to core business processes, the effort is significant. Because many project managers' skills require improvement, the County should establish a program that supports the managers through selected training and, if necessary, ongoing coaching. This training should be aligned with the effort to strengthen the overall project-management program at the County. Project manager training should include (1) how to transform project objectives into a work plan; (2) project scheduling, including critical path; (3) estimating workloads; (4) defining elements of project control and reporting; (5) managing against milestones; (6) how to assess risk; (7) how to deal with stakeholders including sponsors, quality assurance personnel, and end-user communities; (8) defining scope and addressing potential scope changes; (9) dealing with uncertainties and problems; (10) integrating comprehensive components; and (11) conditions that must be met prior to project closure.

BUSINESS CASE

The need at the County to acquire strengthened skills cannot be overstated. Successful projects require advances in leadership, analysis, and project management. Related to leadership, *Computerworld* reports, "… we've found that most of the ingredients for effective leadership today are virtually identical to those that have existed for decades. Leadership today isn't different; it's simply more important than before, particularly in IT organizations." To be effective, "IT leaders must be able to think strategically and technically — defining and articulating to others their department's relevance to their company's missions. They must also be able to act collaboratively, as opposed to autocratically, in order to garner the support of other executives." Furthermore, "IT

leaders also must be held accountable and be measured on factors such as employee morale, customer satisfaction, employee turnover and cost containment."[44]

The benefits of strengthened skills will have a significant impact on the organization. Skill enhancement will impact everything from technology planning to execution. The anticipated results of strengthened skills include improved decision-making capabilities and ultimately increased system performance. Whether it be related to budgeting, systems design, planning, deployment, or project management, skills enhancement will directly impact the County's ability to deliver technology on time and on budget.

Sufficient resources are critical to the success of implementing technology plans and managing technology infrastructure. Lack of these components has been directly linked to technology project failure. According to a 2000 Tech Republic study, approximately 40 percent of technology projects fail. Reasons for project failure included a direct lack of skills in project management and analysis. Two additional reasons were poor project definition and specifications and an inability to manage competing priorities.[45] The planned training will address these issues directly.

Successful organizations require strong staff with the appropriate analytical and project management skill sets. The right skill sets can be attained through the hiring of new staff, or training and retaining current staff. Linda Pittenger, vice president and managing director of IT consulting at the Hay Group, says that "training is a top retention vehicle, and career development is the No. 1 stay item for workers." In addition, "…organizations that skimp on training may pay for it in the long run." In short, companies that retool existing staff are retaining valuable people for future projects as well as attracting new workers.[46] Training in the areas of project management, business analysis, and leadership will have considerable long-term impacts on both retention and the success rates of the County's technology staff.

Costs for strengthening skills are mostly training related. The most significant factor that influences the ability to strengthen skills, however, is time. Even though training may be obtained, skills will be further honed over time. Training will require both classroom and ongoing coaching. Costs for training will be tied to time allocated and whether outside resources are required to supplement instruction.

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[44] Dan Cohen and Gerry Plvermacher, "Making a Case for Today's IT Leaders," *Computerworld* (March 5, 2001) [electronic journal]. Available at http://www.computerworld.com/cwi/story/0,1199,NAV47_STO58256,00.html

[45] Bob Shipmen, "The Telecommunications Program Management Office (PMO): A Vehicle to Gain Project Control and Business Alignment," Sentix, LLC with C.C. Pace Systems, Inc. [white paper]. Available at http://www.ccpace.com/resources/theTelecommunicationsProgramManagementOffice.pdf

[46] Tim Ouellette, "…and Cut Worker Training Benefits," *Computerworld*. (March 30, 1998). [electronic journal]. Available at http://www.computerworld.com/cwi/story/0,1199,NAV47_STO30301,00.html

Related Technology Needs:
- Strengthened Leadership and Management
- Technician Training
- Staff Retention

Related Business Goals/Objectives/ Directions/Opportunities:
- Empower Employees
- Optimize Analysis, Assessment, and Improvement Practices
- Strengthen Project Management
- Enhance Skills

Related Deficiencies:
- Training is managed tactically versus strategically.
- There is limited cross-training between agencies.
- Limited formal funding is provided.
- Employees are often on their own to find help.
- An advanced project-management framework is not in place; standards are lacking.
- Staff are not well trained to conduct planning.
- Business analysis and modeling is not occurring at sufficient levels to adequately support decision-making processes.
- Formal training has not been obtained.

Costs:				Payback:		
Low	**Moderate**	**High**		**Low**	**Moderate**	**High**

Tasks	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1. Define needs	▓	▓										
2. Inventory personnel skills, including management	▓	▓										
3. Evaluate skill "gap"	▓	▓	▓									
4. Determine need for targeted training/coaching		▓	▓									
5. Obtain/deliver training			▓	▓	▓	▓	▓	▓	▓	▓	▓	▓
6. Obtain/deliver coaching (as necessary)			▓	▓	▓	▓	▓	▓	▓	▓	▓	▓

Costs	Year 1	Year 2	Year 3
Capital:			
Operations:	781,250	781,250	556,250
Total:	781,250	781,250	556,250

Capital Costs: N/A.
Operations Costs: Associated with training in Years 1 to 3.

OUTCOME MEASUREMENT

- Capabilities to handle high volume of work/issues
- Better decision making reflected through improved systems performance
- Less need for outside consultants
- Number of business training courses available/attended
- Managerial positions filled with experienced personnel
- Return on investment
- Staff satisfaction surveys and evaluations
- Staff skills
- Project success rate

I.   Strategy Cost Breakdown _____

Strategy Cost Assumptions

The following estimates are being provided for implementing each of the strategies specified in Section VI of the plan. The costs have been placed within a standard framework to facilitate comparative analysis and decision-making. The dollar figures identified within the framework have been footnoted to list the assumptions associated with each amount. Overall assumptions include:

- All dollar figures shown are in constant dollars
- All values are considered to be incremental (additional costs on top of current planned expenditures)
- Costs are considered to be estimates and reasonably conservative
- Each framework accounts for years 1, 2, and 3 of the Strategic Technology Plan
- Additional out-year costs are noted where relevant

The definitions for each of the cost categories listed in the framework are as follows:

I.   Capital Costs

A. *Project Planning*—Associated with the phase where a project is conceived and subsequently documented in a proposal to define the project objectives and business value, as well as an initial analysis of costs, benefits, complexity, risks, and resource requirements.

B. *Project Development*—Associated with strengthening and refining the business case for the project prior to acquisition, implementation, and maintenance funding being granted, including requirements analysis, alternatives analysis, and total cost of ownership analysis.

C. *Implementation*—Associated with the realization of the strategy.

  1. *Hardware*—Hardware including servers, computers, network infrastructure, cabling, telecommunications, and other related costs.

  2. *Software*—Software including application licenses, databases, development or other software tools and reporting tools.

  3. *Staffing*—Human resources dedicated to the project including:

- *Professional Contract Assistance*—Outside consulting service fees.

- *Temporary Assistance*—Staff hired for short-term durations to provide assistance, usually in areas that do not require significant professional expertise.

- *ITS Support* – Information and Telecommunications Services staff.

- *Agency Staff*—County staff other than ITS staff required for such tasks as requirements definition, plan development, workflow re-engineering, etc.

  4. *Support*—Application, network or other related assistance received from hardware or software vendors or service providers.

  5. *Project Expenses*—Associated with the implementation of the strategy that do not fall within other categories.

6. *Other*—Areas not previously addressed within the Capital Costs section.

7. *Contingency*—Additional costs to account for events or costs that are not expected.

II. **Production (Operating Costs)**

A. *Facilities*—Costs associated with facilities – buildings, offices, and structures that can be attributed to the project or strategy.

B. *Maintenance*—Ongoing, post-implementation costs associated with maintaining systems including hardware and software.

C. *Licenses*—Annual software or other license fees.

D. *Upgrades*—Associated with upgrading hardware, software and other areas.

E. *Interest*—Interest on loans or other debt related to technology costs.

F. *Staffing*—Ongoing costs associated with additional staffing required for the strategy or project.

G. *Training*—Costs associated with user and/or technical training assistance.

H. *Hardware*—Purchased hardware including servers, computers, network infrastructure, cabling and other related costs.

I. *Other*—Other ongoing costs that were not captured within other Operating Cost categories.

Strategy Summary Cost Table

Strategy	Year 1		Year 2		Year 3		Total (Years 1 – 3)		Ongoing Operating Costs (Year 4 and beyond)	
	Capital	Operating	Capital	Operating	Capital	Operating	Capital	Operating	Costs	FTE
A1- Service-Level Agreements	200,000		100,000				300,000			
A2- Help Desk			107,500	304,500		244,500	107,500	549,000	244,500	3
A3- Digital Academy		72,500		72,500		72,500		217,500	72,500	
A4- Public Internet			260,000	430,000	260,000	428,000	520,000	858,000	412,000	4
A5- Intranet/Extranet			415,000	424,000	415,000	440,000	830,000	864,000	432,000	4
B1- Asset Management	500,000	100,000		160,000		160,000	500,000	420,000	160,000	1
B2- Standard Operating Procedures	240,000		110,000	62,500		62,500	350,000	125,000	62,500	1
B3- System Security	450,000	171,000		321,000		321,000	450,000	813,000	155,000	1
B4- Business Continuity	450,000						450,000			
C1- Standardize Technology	225,000						225,000			
C2- Web-based Technology	340,000	309,000	150,000	674,000	150,000	1,001,000	640,000	1,984,000	972,000	9
C3- Application Integration	250,000						250,000			
C4- Commercial Applications										
C5- Consolidate Hardware			1,400,000				1,400,000			
C6- Broadband/PBX	350,000		1,290,000	325,000	2,530,000	552,000	4,170,000	877,000		
C7- Enterprise Data Management	500,000						500,000			
C8- LSJ Integration										
C9- (See Below)										
D1- Performance Measurement										
D2- Develop Technology Plans										
D3- Project Management	150,000						150,000			
D4- Reorganize Technology Functions	500,000						500,000			
D5- Specialized Training		781,250		781,250		556,250		2,118,750	31,250	.5
TOTALS:	**4,155,000**	**1,433,750**	**3,832,500**	**3,554,750**	**3,355,000**	**3,837,750**	**11,342,500**	**8,826,250**	**2,541,750**	**23.5**
C9- Enterprise Applications	850,000		17,770,000	100,000	8,270,000	2,400,000	26,890,000[1]	2,500,000	5,340,000	

[1]C9 – Enterprise Applications: Cost estimates for Year 4 and beyond include $27,570,000 in additional capital and operating costs ($5,340,000 of which is ongoing); the capital project is expected to be complete in Year 4.

A. Service Delivery

A1. Utilize service-level agreements as a standard way of doing business.

Costs	Years 1	Years 2	Years 3	3-Year Total
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	200,000[2]	100,000[2]		
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	200,000	100,000		
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs	200,000	100,000		300,000

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[2] Outside contractor developing SLAs at an average of 80 hours each at a rate of $150/hour times an estimated 25 SLAs. An average of 80 hours is estimated although hours will vary by area as current SLAs require revision and others require full development. Current SLAs exist for Server Operations, LAN, Mail, Distributed Systems Services, Website Development and Maintenance, GIS, Hardware Maintenance, and Voice Systems. Areas lacking SLAs include Mainframe, Networking, Application Development, Systems Support, and Help Desk. An additional eleven were added to this count (14) to account for multiple service agencies within each service area (e.g., central and agency help desks). Costs of ongoing review, enforcement and maintenance of SLAs will be absorbed by agency staff.

A2. Reorganize the help desk function around a more centralized, streamlined, and coordinated model.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning		75,000[3]		
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application		25,000[4]		
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance		7,500[5]		
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs		107,500		
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance		4,500[6]	4,500[6]	
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing		240,000[7]	240,000[7]	
G. Training		60,000[8]		
H. Hardware				
I. Other				
Subtotal Operating Costs		304,500	244,500	
Grand Total Costs		412,000	244,500	656,500

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[3] 500 contractor hours @ $150/hour to review current platforms, determine capabilities, and develop a plan for reorganization

[4] Software license costs for full standard version of HEAT- 10 concurrent users @ $2,407/user, as quoted by Competitive Technologies (local re-seller/implementer of HEAT). Additional user licenses will be required in the future as agency help desks align with the centralized help desk on the same software platform.

[5] Vendor fees for implementation of HEAT as quoted by Competitive Technologies

[6] Maintenance fees based on 10 users as quoted by Competitive Technologies

[7] 3 Full Time Equivalents (FTEs) @ $75,000/year for salary and benefits plus $5,000/year for support services (phone, computer, etc.)

[8] Training costs estimated for existing help desk personnel and any new staff regarding new operating procedures and new help desk technology- 2 sessions/year/staff @ $3,000/session

A3. Utilize the State of Washington's Digital Academy to promote learning.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Cost				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs				
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training	60,000[9]	60,000[9]	60,000[9]	
H. Hardware				
I. Other	12,500[10]	12,500[10]	12,500[10]	
Subtotal Operating Costs	72,500	72,500	72,500	
Grand Total Costs	72,500	72,500	72,500	217,500

---

[9] Three agencies, two sessions/year @ $10,000/agency/session as quoted by Washington DIS staff. NOTE: These sessions would be specifically designed for King County.

[10] Mileage- Thirteen weeks/session, one day/week, fifteen staff at each session, assume ten round trips to Olympia/session = 260 round trips/year @ $47.45/round trip (130 miles @ $.365/mile), rounded

A4. Use the Internet as a primary mechanism to deliver public information and services.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers		240,000[11]	240,000[12]	
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools		20,000[13]	20,000[13]	
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs		260,000	260,000	
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance			6,000[14]	
C. Licenses		10,000[15]	10,000[15]	
D. Upgrades				
E. Interest				
F. Staffing		400,000[16]	400,000[16]	
G. Training		20,000[17]	12,000[17]	
H. Hardware				
I. Other				
Subtotal Operating Costs		430,000	428,000	
Grand Total Costs		690,000	688,000[18]	1,378,000[19]

---

[11] Two web/application servers and one database server, each with an additional fail-over server (six total @ $40,000/server for first three years)

[12] Additional servers purchased each year to address new growth in Internet offerings, considered as Capital costs

[13] Two sets Windows 2000 web deployment software (one for each web/application server purchased)

[14] 20% of prior license purchases. Ongoing server maintenance and content management costs are assumed to be absorbed by agency staff

[15] One enterprise license of SQL server

[16] Lead developer and team of three staff @ $80,000 salary plus 25% overhead each- 4 staff X $100,000/staff. These staff are expected to be dedicated to strategy implementation.

[17] Training- $5,000/person for Year 2, $3,000/person ongoing

[18] Costs will continue past Year 3 as the County continues to expand use of the Internet and enhance functionality. Costs for Year 4 are anticipated to mirror those in Year 3, and, thereafter, a slower rate of expansion will result in reducing ongoing capital costs.

[19] Development costs are included in these costs. Content management costs are excluded and assumed to be absorbed by current agency staff. Costs do not include complex systems integrations.

A5. **Promote and support the development of the employee intranet and partner extranet to improve information services and business process support.**

Costs		Years			3-Year Total
		1	2	3	
I. Capital Costs					
A. Project Planning					
B. Project Development					
C. Implementation					
1. Hardware					
• Servers			160,000[20]	160,000[20]	
• Workstations					
• Network					
• Telecommunications					
2. Software					
• Application			50,000[21]	50,000[21]	
• Database					
• Development Tools			30,000[22]	30,000[22]	
• Reporting Tools					
3. Staffing					
• Professional Contract Assistance			175,000[23]	175,000[23]	
• Temporary Assistance					
• ITS Support					
• Agency Staff					
4. Support					
5. Project Expenses					
6. Other					
7. Contingency					
Subtotal Capital Costs			415,000	415,000	
II. Production (Operating Costs)					
A. Facilities					
B. Maintenance				16,000[24]	
C. Licenses					
D. Upgrades					
E. Interest					
F. Staffing			400,000[25]	400,000[25]	
G. Training			24,000[26]	24,000[26]	
H. Hardware					
I. Other					
Subtotal Operating Costs			424,000	440,000	
Grand Total Costs			839,000	855,000	1,694,000

---

[20] Two web servers, one database server and one database server backup- 4 total @ $40,000/server. Ongoing costs include additional server and application costs similar to Year 3, with these costs reducing as demand is met.

[21] Package applications as part of web-enabled service offerings to employees and business partners

[22] SQL Server enterprise license

[23] .5 FTE of consulting for planning and development- 1,000 hours @ $175/hour

[24] 20% of prior license costs

[25] Lead developer and team of three staff. Average of $80,000 salary plus 25% benefits/overhead ($100,000/staff X 4 staff). Staff costs do not represent redundant resources with other strategies. These resources are intended to serve departments and agencies by developing specialized applications for intranet/Internet

[26] Two weeks/year/person (4 staff X 2 weeks/staff = 8 weeks @ $3,000/week = $24,000)

B. Operations

B1. Establish a comprehensive asset management function.

Costs	Years			3-Year Total
	1	**2**	**3**	
I. Capital Costs				
A. Project Planning				
B. Project Development	75,000[27]			
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application	300,000[28]			
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	125,000[29]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	500,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance		60,000[30]	60,000[30]	
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing	100,000[31]	100,000[31]	100,000[31]	
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs	100,000	160,000	160,000	
Grand Total Costs	600,000	160,000	160,000	920,000

[27] 500 contractor hours @ $150/hour to define policies and procedures

[28] Asset Management software as quoted by Intraware (assume approximately 50,000 assets @ $6/asset)

[29] Typical implementation fee for asset management application, including training costs, as quoted by Intraware

[30] 20% of software cost each year which includes support and yearly licensing as quoted by Intraware

[31] Experienced Asset Manager @ $80,000 salary plus 25% benefits/overhead

B2. **Develop standard operating procedures to guide all agencies' technology staff.**

Costs		Years			3-Year Total
		1	2	3	
I.	Capital Costs				
	A. Project Planning				
	B. Project Development				
	C. Implementation				
	1. Hardware				
	• Servers				
	• Workstations				
	• Network				
	• Telecommunications				
	2. Software				
	• Application				
	• Database				
	• Development Tools				
	• Reporting Tools				
	3. Staffing				
	• Professional Contract Assistance	200,000[32]	50,000[32]		
	• Temporary Assistance				
	• ITS Support				
	• Agency Staff				
	4. Support				
	5. Project Expenses				
	6. Other	40,000[33]	60,000[33]		
	7. Contingency				
	Subtotal Capital Costs	240,000	110,000		
II.	Production (Operating Costs)				
	A. Facilities				
	B. Maintenance				
	C. Licenses				
	D. Upgrades				
	E. Interest				
	F. Staffing		62,500[34]	62,500[34]	
	G. Training				
	H. Hardware				
	I. Other				
	Subtotal Operating Costs		62,500	62,500	
	Grand Total Costs	240,000	172,500	62,500	475,000

---

[32] Contracted SOP development as identified in the following strategies: Help Desk, Strengthen Security, Enterprise Data Management, Intranet & Extranet, and Consolidate IT Function. Others required include Programming, Maintenance, Training, Administration, and Operations- Average $25,000 (approximately 165 hours @ $150/hour) for each SOP. Assume eight SOPs developed in Year 1 and two in Year 2.

[33] Once SOPs are developed, staff require training related to procedures. Costs estimated at $20,000/quarter for Year 1, Quarters 3 and 4, and Year 2, Quarters 1, 2, and 3. Year 3 and beyond training costs will be absorbed by internal staff.

[34] Assume one FTE for maintenance of SOPs- $50,000 salary + 25% benefits/overhead. Anything over one FTE will be absorbed internally.

B3. Strengthen system security.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network	120,000[35]			
• Telecommunications				
2. Software				
• Application	30,000[36]			
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	300,000[37]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	450,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance	30,000[38]	30,000[38]	30,000[38]	
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing	125,000[39]	125,000[39]	125,000[39]	
G. Training	16,000[40]	16,000[40]	16,000[40]	
H. Hardware				
I. Other		150,000[41]	150,000[41]	
Subtotal Operating Costs	171,000	321,000	321,000	
Grand Total Costs	621,000	321,000	321,000	1,263,000

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[35] Six new firewalls

[36] Intrusion Detections Software (IDS)- 8 – 10 copies

[37] Security assessment and consulting- 1,500 hours at $200/hour

[38] 20% of licensing for firewalls and IDS

[39] Security manager- $100,000 salary plus 25% benefits/overhead

[40] Four training sessions per year ($4,000/session based on local classes taught by Verisign) to address firewalls, intrusion detection, security incident handling and general network security

[41] Ongoing security penetration testing and consulting- 750 hours each year at $200/hour

B4. **Strengthen business continuity capabilities.**

Costs	Years			3-Year Total
	1	**2**	**3**	
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	450,000[42]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	450,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs	450,000			450,000

[42]Approximately 3000 contractor hours @ $150/hour – used either to assist the Governance group in developing a plan, or to continue planning at a detailed technical level supporting the Governance group. These costs represent planning activities and do not account for implementation costs. Initial planning efforts will be conducted by the Governance group and focus on mission-critical enterprise functions, including applications, telecommunications, hardware/network, and facilities. This strategy assumes the plan will be developed at a moderate level of detail.

C. ***Architecture (web, applications, and infrastructure)***

C1. **Standardize technology including infrastructure, hardware, and applications software.**

Costs	Years 1	Years 2	Years 3	3-Year Total
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	225,000[43]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	225,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs	225,000			225,000

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[43] 1,500 contractor hours @ $150/hour for identifying, selecting and recommending standards for each relevant technology. Technologies requiring standardization include Operating systems, Databases, Hardware, Office Automation, Reporting tools, Routers, Network printing devices, Cabling, Network cards and drivers, hubs and switches. Ongoing maintenance of and enforcing compliance with the standards is assumed to be conducted by the TMB.

C2. Standardize Web-based technology used on the intranet, Internet, and extranet.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers	160,000[44]	80,000[45]	80,000[45]	
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application	160,000[46]	60,000[47]	60,000[47]	
• Database				
• Development Tools	20,000[48]	10,000[49]	10,000[49]	
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	340,000	150,000	150,000	
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance		36,000[50]	54,000[50]	
C. Licenses		20,000[51]	20,000[51]	
D. Upgrades				
E. Interest				
F. Staffing	300,000[52]	600,000[52]	900,000[52]	
G. Training	9,000[53]	18,000[53]	27,000[53]	
H. Hardware				
I. Other				
Subtotal Operating Costs	309,000	674,000	1,001,000	
Grand Total Costs	649,000	824,000	1,151,000	2,624,000

---

[44] 2 pairs of Dual-CPU Intel servers @ $40,000 each

[45] Anticipate two additional servers each year for growth in years 2 & 3. Depending on the mix of strategies selected for implementation, there may be some opportunity to reduce the number of servers required overall, but separate servers will be needed for the Intranet and Inter/Extranet. It is likely that server costs will continue after Year 3 associated with continued development of web applications

[46] Content Management System- Assume two server licenses. Typical costs are $30 – $40,000 per CPU(4 CPUs X $40,000/CPU - $160,000)

[47] Allowance for add-on tools in years 2 & 3, Estimate for Web Services production server. BizTalk currently priced at $25,000 per CPU

[48] Vstudio.NET $1,079 per seat. IIS Server is included with Win2000, for Cold Fusion, $500 per development seat plus $2000 per server license – $20,000
[49] Half of prior year expenditure to account for additional development seats. Development tools noted here are for generic, enterprise-wide applications and do not constitute redundant costs with other strategies that also call for development tools

[50] 20% of license costs

[51] Additional user licenses in years 2 and 3

[52] Anticipate initial team of three developers. ($80,000 salary plus 25% benefits/OH = $100,000/staff X 3 staff = $300,000). Augment with additional three hires in years 2 & 3. Staffing costs are associated with content management and portal services, and Year 2 and 3 staff resources are aimed at Web services

[53] One session of training/staff @ $3,000/session

C3. Standardize County technical approach for application integration

Costs	Years			3-Year Total
	1	2	3	
II. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	250,000[54]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	250,000			
III. II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs	250,000			250,000

---

[54] Approximately 1,650 hours @ $150/hour of contracted assistance establishing guidelines, evaluating tools, conducting analysis, selecting a methodology, and developing a plan.

C4. **Purchase and integrate top quality commercial packaged software wherever possible and cost effective – and with minimal customization.**

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning[55]				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs				
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing[56]				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs				

---

[55] This strategy involves the development of a methodology for selecting new systems focusing first on off-the-shelf applications before building applications.
[56] This work will be absorbed by the TMB and BMC.

C5. Consolidate hardware around the County.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning		60,000[57]		
B. Project Development				
C. Implementation				
1. Hardware				
• Servers		1,200,000[58]		
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance		40,000[59]		
• Temporary Assistance		100,000[60]		
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs		1,400,000		
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs		1,400,000		1,400,000

---

[57] 400 hours of consulting and project management fees @ $150 /hr. to analyze current capacity and develop plan for new server configuration

[58] 30 new high-end servers at $40,000 per device, equipped to handle the traffic and performance requirements for merged operations.

[59] Consulting support for problem resolution (approximately 250 hours at $150 /hr)

[60] Full year of one temporary FTE @ $100,000 to assist with configuration, consolidation and design

C6. **Use broadband technology and a fully integrated PBX architecture as the future centerpiece to converge data, voice, and video transport.**

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning	350,000[61]			
B. Project Development		120,000[62,63]	100,000[62]	
C. Implementation			250,000[64]	
1. Hardware				
• Servers				
• Workstations		30,000[63]		
• Network			360,000[65]	
• Telecommunications		500,000[66]	1,375,000[67]	
2. Software				
• Application		350,000[68]	250,000[69,70]	
• Database				
• Development Tools		75,000[71]		
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance		165,000[72]	195,000[73]	
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other		50,000[74]		
7. Contingency				
Subtotal Capital Costs	350,000	1,290,000	2,530,000	

---

[61] Strategy implementation planning

[62] PBX- Non-recurring network conversion costs (termination liabilities, physical network terminations)

[63] Broadband- Year 2 will be for planning and analysis, and includes startup costs for establishment of workspace and workstation hardware/software

[64] Broadband- Startup costs for establishment of mini NOC (network monitoring, work order/trouble ticket management system, communications system)

[65] Broadband- GB Edge Device(s) – $300,000 (4 primary nodes, Key Tower and 3 secondary nodes); Cable/Infrastructure (equipment rooms and minor cable at NOC) – $10,000; Test equipment – $50,000 (Network Analyzer)

[66] PBX System hardware upgrades/replacement (will occur in phases over three years) – $250,000 for Year 2; Replacement of Centrex lines with VoIP- Year 2 (250 lines @ $1,000/line = $250,000)

[67] PBX System hardware upgrades/replacement – $100,000; Replacement of Centrex lines with VoIP- Year 3 (1,500 lines @ $850/line)

[68] PBX integration software upgrades – $150,000, + Voice mail systems replacement/upgrades – $200,000 = $350,000

[69] Broadband- Network loading and simulation/measurement software

[70] PBX- Voice mail systems replacement/upgrades

[71] PBX- Network management system tools

[72] PBX- Outsourced assistance for voice system integration- network design ($40,000), Configuration/upgrade analysis ($60,000), public procurements ($10,000), upgrade existing system ($5,000), network management ($20,000), disaster recovery ($30,000)

[73] PBX- Outsourced assistance- public procurements ($10,000), upgrade existing system ($10,000), project management ($100,000), QA ($50,000), staff training ($25,000)

[74] PBX- Establish disaster recovery diverse access to PSTN – hardware/software/programming. Robust disaster recovery planning efforts will be conducted as part of the strategy to strengthen business continuity capabilities

Costs	Years			3-Year Total
	1	2	3	
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing		325,000[75,76]	522,000[75,77]	
G. Training			30,000[78]	
H. Hardware				
I. Other				
Subtotal Operating Costs		325,000	552,000	
Grand Total Costs	350,000	1,615,000	3,082,000	5,047,000[79]

---

[75] PBX- Internal staffing costs associated with voice system integration, including network design, configuration/upgrade analysis, public procurements, network management, and quality assurance

[76] Broadband- Senior Project Manager ($110,000), Senior Financial Analyst ($50,000 - .5 FTE), Senior Tech Analyst ($100,000). Staffing costs represent costs for outsourced assistance.

[77] Broadband- Sr. Project Mgr ($110,000), Sr. Financial Analyst - .25 FTE ($25,000), Sr. Tech Analyst ($100,000), Network Engineer A ($88,000), Network Tech A ($64,000), Customer Support Level 2 ($45,000). Staffing costs represent costs for outsourced assistance. These costs can be reduced by utilizing appropriately qualified agency staff in place of external staff

[78] Broadband- Training costs focus on network loading and simulation/measurement software- 10 sessions @ $3,000/session.

[79] PBX- Relevant costs beyond Year 3 include: PBX system hardware upgrades/replacement ($100,000); replacement of Centrex lines with VoIP (6,000 lines @ $700/line); Voice mail systems replacement/upgrades ($100,000); Outsourced assistance- public procurements ($10,000), upgrade existing system ($10,000), project management ($25,000), QA ($25,000). Total costs beyond Year 3 = $4,200,270.

C7. **Institute Countywide best practices for enterprise data management.**

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	500,000[80]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	500,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training[81]				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs	500,000			500,000

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[80] Approximately 2,500 hours @ $200/hour for contracted assistance with defining requirements, developing policies and standards, developing a data model framework, analyzing alternatives, and developing a plan and methodologies.

[81] Training is not planned as staff hired for modeling are expected to be experienced with the tool sets and will self- train.

C8. Design and implement a common architecture to integrate workflow between Law, Safety, and Justice agencies.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning[82]				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs				
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs[83]				

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[82] Planning and design work is anticipated to occur in Years 1 and 2, and implementation in Year 3.
[83] Costs are currently being developed by the LS&J Integration Committee.

C9. Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.

Costs	Years 1	2	3	3-Year Total
I. Capital Costs				
A. Project Planning	600,000[84]			
B. Project Development				
C. Implementation	250,000[85]	500,000[85]	250,000[85]	
1. Hardware				
• Servers		750,000[86]	500,000[86]	
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance		11,720,000[87]	5,367,000[88]	
• Temporary Assistance		1,200,000[89]	538,000[89]	
• ITS Support				
• Agency Staff		3,600,000[87]	1,615,000[88]	
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	850,000	17,770,000	8,270,000	
II. Production (Operating Costs)			2,300,000[90]	
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training		100,000[91]	100,000[91]	
H. Hardware				
I. Other				
Subtotal Operating Costs		100,000	2,400,000	
Grand Total Costs	850,000	17,870,000	10,670,000	29,390,000

[84] Per Dye Report- Implementation Planning ($122,250 in consultant fees plus $24,450 T&E plus 20% contingency- $175,000 rounded; $19,800 in County staff costs plus 20% contingency- $25,000 rounded) and Integrator RFP and Selection ($78,250- consulting plus $15,650 T&E plus 20% contingency- $140,000 rounded; $33,750 plus 20% contingency for County staff-$ 60,000 rounded); an additional $200,000 (approximately 1,350 hours @$150/hour) for requirements definition

[85] An additional $1,000,000 over three years for business process alignment to the package at the agency level. The Dye report accounts for some business transformation and change management, but only in Year 1. These additional costs are for assumed additional process alignment in Year 1 as well as some costs incurred in Years 2 and 3 for change management

[86] Per Dye Report- $1,250,000 during Phases 1, 2 and 3 for hardware for PeopleSoft Release 8 (web server and four- to six-fold increase in application server processor capacity)

[87] Per Dye report- consulting fees plus T&E and County staff costs for Phase 0- $2,520,000 for external staff, $300,000 for internal, and Phase 1, 2 and 3 ($9,200,000 for external staff, $3,300,000 for internal)

[88] Per Dye report- consulting fees plus T&E and County staff costs for Phase 0- $1,260,000 for external staff, $150,000 for internal, and Phase 1, 2 & 3 (3,640,000 for external staff, 1,310,000 for internal), and Phase 4 ($467,000 for external staff, $155,000 for internal)

[89] Backfilling Agency staff with temporary assistance. Costs derived by calculating the difference between Agency staff costs @ $45/hour and a more reasonable estimate of temporary assistance costs @ $60/hour.

[90] Per Dye Report – high end of range for O&M costs

[91] Additional training costs provided as high level estimates by PeopleSoft. Dye report accounts for training of only 40 – 50 users

C9. (Continued) Implement a standardized integrated portfolio of enterprise Financial and HR/Payroll applications.

Additional costs for Year 4 include the following:

Costs	Year 4	Total Years 1-4
I. Capital Costs		
A. Project Planning		600,000
C. Implementation		1,000,000
1. Hardware	1,750,000[92]	1,750,000
• Servers		1,250,000
2. Software		
• Application	3,200,000[93]	3,200,000
3. Staffing		
• Professional Contract Assistance	7,840,000[94]	24,927,000
• Temporary Assistance	2,300,000[95]	4,038,000
• Agency Staff	7,040,000[96]	12,255,000
Subtotal Capital Costs	22,130,000	49,020,000
II. Production (Operating Costs)	5,000,000[97]	7,300,000
B. Maintenance	340,000[98]	340,000
G. Training	100,000[99]	300,000
Subtotal Operating Costs	5,440,000	7,940,000
Grand Total Costs	27,570,000	56,960,000

Assumptions
- These estimates are primarily based on the Dye Management report, "Project Assessment and Implementation Planning: Implementation Plan".
- Costs assume that the County will follow the phased approach outlined within the Dye report.
- The County owns licenses for PeopleSoft.
- Costs are placed in the year based on the timeline presented within the Dye report, with Year 1 of the strategy representing Year 2001 from the Dye report. There is a two-year lag between the Dye report and the STP. The phases from the Dye report which occur in Year 1 include: Detail Implementation Plan and Integrator RFP and Selection Process; Year 2- Phase 0:Vision Validation and Pre-Project Preparation, Phase 1: PeopleSoft HRMS Sustaining, Phase 2: MSA to PeopleSoft HRMS; Year 3- Phase 3: Enhanced HR Functionality, Phase 4: Core Financials Software Evaluation. Phase 5 and 6: Core Financials Implementation occurs in Year 4.
- All costs require that new detailed analysis is conducted concurrent with vendor bids prior to implementation.
- Additional costs will be required to backfill agency staff assigned to the implementation project. Cost figures for King County staff included within the Dye report are assumed to be incurred to hire temporary staff to backfill. Additional costs have been noted for Temporary Assistance based on the difference between the Dye report's assumption of $45/KC staff hour and the assumption that these costs will be closer to $60/hour.
- These costs assume that by the end of Year 3, King County will have accomplished the following: Developed an implementation plan, developed and distributed an RFP for an Integrator, selected an Integrator, verified requirements, conducted appropriate business process alignment activities, upgraded PeopleSoft, implemented full PeopleSoft HRMS suite and migrated current HR/Payroll applications to the new platform, and conducted an evaluation for implementation of a core financials suite of applications.

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[92] Per Dye report, replacement hardware costs to replace hardware previously purchased for FSRP, but which has since been redeployed
[93] Phases 5 and 6 focus on Core Financials. High-level estimates provided by PeopleSoft are based on Operating Budgets rather than number of users-For an operating budget of $2,000,000,000, software costs for PeopleSoft financials would be approximately $3,200,000, and include the following applications: General Ledger, Accounts Payable, Purchasing, Accounts Receivable, Billing, Inventory, Projects, Budgeting, Fixed Assets, and Grants.
[94] Per Dye report, Phase 0 consulting costs @ $330,000 plus $4,875,756 plus $975,151 travel and expenses plus 20% contingency for consulting fees for Phases 5 and 6 - 7,510,000 rounded
[95] Approximate difference between Dye report costs for County staff @ $45/hour and assumed actual cost for temporary staff @ $60/hour
[96] Per Dye report, Phase 0 Agency staff costs @ $40,000 plus $5,850,578 plus 20% contingency for County staff- 7,000,000 rounded
[97] Per Dye report - $3,400,000 for PeopleSoft, $1,600,000 for SAP for O & M
[98] Per Dye report, SAP Interim Maintenance fees
[99] Additional training costs provided as high level estimates by PeopleSoft. Dye report accounts for training of only 40 – 50 users

D. Management and Organization

D1. Institutionalize performance measurement for technology.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning[100]				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs				
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs				

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[100] A County committee is assumed to perform the work to support this strategy.

D2. Develop technology design/plans for significant initiatives and projects.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning[101]				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs				
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs				

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[101] Costs associated with this strategy will be absorbed as part of developing Agency technology plans and project plans

D3. Establish a comprehensive project management program.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning				
B. B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	150,000[102]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	150,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training	0[103]			
H. Hardware				
I. Other				
Subtotal Operating Costs	0			
Grand Total Costs	150,000			150,000

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[102] 1000 hours @ $150/hour consulting time to facilitate development of a project management methodology framework. NOTE: Deployment of the project management methodology framework is assumed to be absorbed within normal workloads

[103] Training required, but covered within a separate strategy for strengthening personnel capabilities through training

D4. Reorganize technology functions around the County.

Costs	Years 1	2	3	3-Year Total
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance	500,000[104]			
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs	500,000			
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing				
G. Training				
H. Hardware				
I. Other				
Subtotal Operating Costs				
Grand Total Costs	500,000			500,000

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[104] A total of $500,000 (approximately 2,850 hours @ $175/hour) is estimated for an organizational consultant to conduct a study related to re-organizing technology functions around the County. The project may be segmented into two phases with $400,000 for consulting for the organizational assessment and development of a plan, and an additional $100,000 for facilitating concurrence within the organization.

D5. Strengthen technology management and delivery capabilities through specialized training.

Costs	Years			3-Year Total
	1	2	3	
I. Capital Costs				
A. Project Planning				
B. Project Development				
C. Implementation				
1. Hardware				
• Servers				
• Workstations				
• Network				
• Telecommunications				
2. Software				
• Application				
• Database				
• Development Tools				
• Reporting Tools				
3. Staffing				
• Professional Contract Assistance				
• Temporary Assistance				
• ITS Support				
• Agency Staff				
4. Support				
5. Project Expenses				
6. Other				
7. Contingency				
Subtotal Capital Costs				
II. Production (Operating Costs)				
A. Facilities				
B. Maintenance				
C. Licenses				
D. Upgrades				
E. Interest				
F. Staffing	31,250[105]	31,250[105]	31,250[105]	
G. Training	750,000[106]	750,000[106]	525,000[107]	
H. Hardware				
I. Other				
Subtotal Operating Costs	781,250	781,250	556,250	
Grand Total Costs	781,250	781,250	556,250	2,118,750

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[105] .5 FTE @ $50,000 salary + 25% for benefits/overhead for coordinating training and maintaining the skills inventory

[106] Training in the following areas: Leadership ($250,000/year), Business Analysis ($250,000/year) and Project Management ($250,000/year)

[107] It is anticipated that increased in-house training will decrease the annual training costs in each area to $175,000/year

II. Agency Goals Matrix

The following matrix provides a summary of goals, issues, objectives, directions, and opportunities as reported by each agency during the information gathering phase of the technology strategic planning process. Information sources for this matrix include agencies' 2001 business plans, interviews, and survey responses. The information in this table has been summarized within Section IV.A. (Business Environment, Strategic Objectives) of the strategic technology plan.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Adult and Juvenile Detention	• Provide adult and juvenile detention facilities that are safe, secure, humane and orderly. • Support/respond to public and other criminal justice and human service agencies' interests and objectives. • Provide a catalyst for change in the lives of offenders. • Value employees, involve them in decisions that affect them, and enhance communication initiatives. • Conduct criminal justice policy analysis and program development for short- and long-range correction services and capacity planning.	• Staff training. • Collaborative partnerships with Superior Court and other JJOMP stakeholders. • Meet service and program requirements in accord with applicable federal, state, and local laws.		• Enhance newly implemented internal website as scheduled (to provide employees with seamless, easy-to-use computer network systems that provide access to available King County data resources and application in order to support operations). • Juvenile wide area network direction replacement.	• Opportunities for improving efficiency within or between agencies including integration efforts.
Dept. of Assessments	• Develop a quality product based on adherence to professional standards and the provision of law pertaining to the department. • Create and maintain a positive workplace promoting cooperation, initiative, human diversity, open communication and professionalism. • Be recognized as providing outstanding service to all customers, internal and external. • Provide training, technology and all other resources necessary to enable employees to achieve excellence.	• Keeping staff at previously approved FTE levels. • Use of effective and efficient technology. • Proposed 2002 budget cuts. • Aside from the State Department of Revenue, no other government agency is responsible for activities currently assigned by state law to the assessor in each County.		• Technology implementation has allowed the Department to somewhat keep up with production demands. • Some new technology equipment implemented in 2000. • Completion of office remodel to re-establish a safe, productive and efficient work environment. • Generating fiscal notes and impact statements for the Office of Community Development.	• Funding for additional appraisal staff. • Funding for planned equipment replacement in the future.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Assessments	• Better service and more accessible data. • Reallocate additional resources to the appraisal function to help minimize already challenging workload pressure. • Ensure staff have equipment to do their jobs effectively and efficiently to help maintain a flexible environment in which the Department can adapt to change.			• Successful completion of the annual revaluation process "providing fair, equitable and understandable property valuations," utilizing effective and efficient technology.	
Boundary Review Board	• To provide a balanced, objective review and evaluation of proposals for annexations, incorporations, mergers and other actions, to serve the citizens of the affected area, government agencies and other stakeholders. • To enhance operations systems (e.g., communication tools, procedures, record keeping) to ensure the quality and efficiency of services to the County, other government agencies, citizens and other stakeholders. • To provide administrative services (e.g., performance/activity reports, fiscal reports) in support of all purposes/core business services, and to achieve these services at reasonable cost to the County.			• The Boundary Review Board is seeking innovative opportunities for developing and implementing strong communication systems linking to King County, to other government agencies, and to other stakeholders, in order to facilitate high-quality government operations and public services. • Development of a pilot web site to provide government and public access to legislative requirements for annexations, incorporations, mergers and other actions. • Work with Archives and Records Management to develop systems for records' storage. • The Boundary Review Board proposes a business plan for achieving core service goals and core service objectives, including an assessment of future responsibilities and directions.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Community and Human Services	• Food to eat and a roof overhead.	• Partnering/networking with other governmental and community agencies.	• Provide public defense services per state law and county code.		• Web-based public access to service information.
Dept. of Development and Environmental Services (DDES) - Administrative Services Division	• Improve DDES information systems for best-supported customer service. • Improve management and staff awareness of accurate, consistent and timely application of Department financial system information. • Provide accurate and accessible resource information to support consistent regulatory review in environmental protection. • Develop and enhance human resources support system to further the Department's integrated staffing, educational and personal development initiatives. • Enhance cost control. • Make the network easier to operate, reduce the cost of operation where possible, meet current and future demands of applications.	• Thin client strategy within the Department • Implementation of a revised Joint Labor Management Committee • Improved management information systems • Transition of business licenses to Department in 2002 • Matching service levels to revenues		• Hardware/Software conversions in 2002. • Changes to the structure and operation of the network are being implemented to take advantage of new technology, improvements in network equipment and software, and introduction of new network service offerings. • Plan, develop, market, and deliver a core set of information services/products that meet the business requirements of County government, outlying cities, and other jurisdictions. • Provide technology leadership and enterprise-wide infrastructure to the County's citizens and departments. • Improve ITS' collaboration with County agencies as an integral partner in our shared business environment.	• Provide electrical permits, benefiting citizens and assisting in financial stabilization of the Department. • Transfer of health-related building permits such as sewage and water to the Department, assisting customers through one stop shopping and assisting in financial stabilization of the Department. • Increased staff utilization through additional training, better technology systems. • Organizational and financial partnering with Sheriff's Office.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Development and Environmental Services (DDES) - Administrative Services Division				• Improve the County's process for making IT investment decisions. • Develop ITS and Countywide IT standards. • Develop and utilize measurements to track and improve the reliability, quality, and performance of the infrastructure and services provided.	
DDES - Building Services Division	• Manage resources to meet and exceed performance standards. • Meet financial goals and objectives. • Deliver reliable and responsive customer service and public education. • Develop and maintain a skilled workforce through an effective employee orientation and development program and enhance technical training processes. • Improve division work processes through efficient implementation of value-added services. • Manage resources to meet and exceed performance standards. • Improve DDES information systems for best-supported customer service. • Improve management and staff awareness of accurate, consistent and timely application of Department financial system information.. • Provide accurate and accessible resource information to support consistent regulatory review in environmental protection.	• Matching service levels to revenues. • It is a continuing challenge to meet the departmental standard for intake appointment times within 2-4 weeks, at peak periods, with existing staff. • ESA Impacts: Legislation to implement the Endangered Species Act will increase the level of reviews and inspections of site features and directly impact review times/permit fees. • Zoning Service: Customers continue to expect that zoning and land use information will be provided, on demand and at no cost, in person or by telephone. • Business Licensing: the proposed addition of Business Licensing responsibilities to the Code Enforcement Section without additional resources. • Methamphetamine Labs: The number off methamphetamine labs continues to grow each year. Code enforcement officer face safety concerns together with multiple violations on lab sites.	• Increase percent of key permits approved within timelines. • Increase percent of work completed within established targets. • Establish review standards for key work functions. • Maintain 70 percent billable and chargeable hours. • Ensure revenues match cost of providing services. • Develop clear guidelines/limitations for walk-in zoning service. • Increase revenue from permit extensions by addressing all expiring permits. • Establish a baseline level of external customer satisfaction by conducting surveys. • Maintain or improve ISO ratings. • Maintain or improve telephone response time. • Maintain or increase percent of technically trained staff. • Increase number of employees who repot confidence in their knowledge and skills after 6 months by providing appropriate training. • Establish sustainable process to ensure work is completed or closed. • Inactive applications cancel after sixty days.	• Developing public information tools that do not require interaction with production staff; implementing training and process and technology improvements that increase staff's ability to achieve this billing rate; and ensuring that review standards are in place that provide consistent hours of reviews and bills for service for similar permits. • Plan to implement inspection appointments by touch-tone phone (IVR), explore on-line permitting for minor permits, and improve upon on-line permit tracking information and on-line financial information. • Joint Labor Management Committee made up of Local 17, Local 519, and management representatives. Will continue to engage in all possible strategies to maintain/improve upon our collaborative work environment. • Implementation of the Sensitive Area Designation Ordinance that places site feature designations in advance of permit review should decrease tension between applicants and Department, and make permit review more efficient.	• Redesigning review processes. • Creating phased approval process for new construction. • Implementing integrated voice response system. • Partnering with stakeholders such as school districts and the master builders association. • Lower insurance rates for property owners. • Matching service levels to revenues. • PICA Process: An update of the PCA process (pre-issuance construction authorization) provides an opportunity to redesign review processes and consider a phased approval process for new construction to reduce delays and improve customer service. • With the proposed implementation of an integrated voice response system, significant process changes will need to be undertaken to automate the inspection request process. • Project Management: The project management program for complex permits has had a successful year with participation by applicants on a voluntary basis.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DDES - Building Services Division	• Develop and enhance human resources support system to further Department's integrated staffing, education, and personal development initiatives. • Enhance cost control. • Improve public access to information while reducing the non-billable hour rate of production staff. • Increase the percentage of permits meeting the statutory timelines in the most cost-effective manner possible. • Maintain/Improve financial stability. • Implement/Enforce Tri-County ESA model with regulations the public understands and DDES is able to implement and enforce without confusion. • Achieve sustainable reimbursement for all contracted work in return for high quality services. • Deliver quality, dependable land use services in a timely manner. • Promote and maintain sound financial management of the Land Use Services Davison through reliable business practices. • Protect and improve the quality of the natural environment, consistent with County land use regulations. • Promote quality communities by developing regulatory improvements. • Develop/Maintain a positive and collaborative work force with the Land Use Services Division.	• The demand for management information systems and reports consistently outstrips the Division's resources to satisfy such requests. • The lack of a fund balance destabilizes the Department's operations and requires operational financial response with very little time or data. • The wealth of information demanded by Department management and staff require constant upgrading of hardware and software. • The provision of business based information daily, weekly and especially on a monthly basis is critical to the success of the Department's fund management and staff retention. • Staff turnover in computer related fields constantly challenge the department to maintain its systems and thus business success. • Supervisory staff in the ASD are highly technical and sought after. • Lack of general government financial support to the permit-related function will expose decision-makers to an increasing level of criticism due to high fees. • Lack of resources limits maintenance of a training program for professional staff. • Increasing overhead allocations. • The health of the building industry is an uncontrollable variable in the department's financial health.	• Expired permits are renewed or finaled. • Code Enforcement cases closed. • Annual fire and PBX inspections are maintained. • Improve the maintenance of clock time on permits. • Development of active permit file management redesign. • Increase public knowledge of DDES web page. • Implement alternative to "person of the day program." • Increase alternative means of acquiring permit information and permit approval on-line. • Improve management information systems used by line supervisor to monitor production performance. • Utilization of project management, and review standards implementation to ensure timelines. • Control O&M costs at or below budget. • Maintain 70 percent billable hour rate. • Develop enhanced public information and staff training programs in order to ensure public and County staff understanding of ESA implementation. • Develop a marketing plan for regional and specialty services. • Increase the percent of permits completed per mandated timelines. • Establish management and performance standards for key job functions and permits types. • Maintain 70 percent billable hours and chargeable hours.	• The Department intends to take a serious look at the County's Code requirements for business licensing, some of which are more than 50 years old, and propose the elimination or modification of numerous licensing requirements that are out of date.	• Customer Outreach: Previous efforts to provide outreach to customer groups have been extremely successful. Will continue to seek opportunity to partner with stakeholders such as school districts and master builders association, and share our "best practices." • This will present an opportunity to demonstrate effective enforcement of the building codes in the County and result in lower insurance rates low for property owners. • Legislative initiatives allowing County DDES to provide electrical permits would benefit DDES citizens and customers and assist in financial stabilization of the Department. • The transfer of health-related building permits such as sewage and water to DDES would assist customers and citizens of the County through "one stop shopping." It would also help financially stabilize DDES. • Opportunity to coordinate the ESA goals into the Country's Shoreline Master Program and remove redundancies in the permit review process for projects on shorelines.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DDES - Building Services Division	• Provide a clear exchange of information to colleagues and customers, regarding land use matters.	• It is a great challenge to ensure that the Department's staff and customers can obtain and manage information made available to them. • The Department has a lengthy history of challenging labor-management relations. • Ensure that the agenda of the environmental community brought on by the ESA imperatives is implemented in such a way as to allow the development community to continue to provide affordable housing for our community. • Reductions occurring when DDES and the County urgently need education and outreach to implement programs to cover higher stake liability issues of implementing ESA. • It will be a challenge to respond to increased state and federal legislation and requirements related to the long range planning process without retaining current staff resources.	• Ensure the revenues meet or exceed the cost of providing services. • Decrease the amount of non-billable hours associated with public information by implementing an alternative to the "person of the day" program. • Evaluate potential benefits of merging the ESA/Erosion Control Program into other DDES inspection sections. • Transmit all proposed regulations on time per the detailed work of the Land Use Planning and Education Section. • Maintain or increase the percent of trained staff. • Facilitate citizen and staff participation and training in the development and implementation of new regulations.		
DDES - Director's Office	• Improve public access to information while increasing staff billable hours. • Increase percentage of permits while meeting statutory timelines in a cost-effective manner. • Maintain/Improve financial stability • Implement/Enforce Tri-County ESA model with minimal confusion. • Achieve sustainable reimbursement for high quality services.	• Increased access to public information while reducing staff time for public information activities • Implementation of process improvements and permit review standards • Improved management information systems		• Implemented new permit tracking system, financial system, enhanced GIS application and on-line record management • Plan to implement touch-tone phone (IVR) inspection appointments in 2002	• Maintenance of stable, well-trained work force through additional staff training.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DDES - Land Use Services Division	• Deliver quality, dependable land use services in a timely manner. • Promote/Maintain sound financial management through reliable business practices. • Protect/Improve quality of the natural environment, consistent with County land use regulations. • Promote quality communities by developing regulatory improvements. • Develop/Maintain a positive and collaborative work force. • Provide a clear exchange of information to colleagues and customers regarding land use matters	• Retaining current staff level while responding to increased legislation and requirements.		• Will implement in 2002 a program utilizing existing building and land use inspectors for increased ESA awareness.	• Monitoring results of the Rural Standards Program to refine standards needed to preserve rural character. • Active participation in the Rural Forest Commission to maintain viable private forestry.
Dept. of Executive Services (DES)	• Identify and meet changing customer requirements. • Encourage/Expand the use of strategic partnerships. • Maintain/Enhance an empowered, highly skilled workforce reflecting the diverse community we serve. • Management information and technology to improve services and information sharing. • Provide leadership to meet the current and future needs of the County. • Exercise responsible stewardship of County resources. • County applications are usable from a browser of an authorized user. • County data is well defined, standardized, and usable from a browser of an authorized user. • Maximize investments made on the future environment, rather than on the legacy applications.	• Organizational restructuring and possibility of Commission administrator assuming new responsibilities swill require Commission to be more focused and collaborate on its work projects. • Organizational restructuring will impact County department staff's ability to work with Commission on community criminal justice projects. • The Civil Rights Commission will increase its community partnership s to provide more opportunities for community education on civil rights. • Fair Contracting and BOOST Ordinances are new and untested. Commission will need to monitor how they are publicized to community and how quickly they are implemented.		• Minimize investments on legacy systems in preference for the Next Generation e-County services. • Maintain legacy systems to meet basic business needs. • Upgrade legacy systems only to meet changing business requirements or to stay current with vendor releases. • Provide an exception process to allow enhancement and replacement of legacy systems when there is a strong business case. • Acquire connection products that bring legacy applications to the Web for users to logon and use the applications. • Provide security to prevent unauthorized access to legacy data. • Assemble a suite of middleware products to bring legacy data to the Web.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Executive Services (DES)	• To propose a standardized business model that LAN Administrators can evolve to within the County. • To develop, coordinate and manage a complex enterprise computing environment that will facilitate, support and service the County's computing applications. • Enhance stability, reliability, and availability of computing resources across all platforms, with emphasis on building strong production environment for distributed systems. • Improve effectiveness of County core business processes by building, updating and maintaining enterprise applications, databases, and digital repositories that serve core business needs. • Maintain strong network infrastructure. • Improve staff productivity and control IT costs. • Support/Champion improved decision-making process for Countywide IT strategic planning and investment decisions. • Support/Champion Countywide improvements in project management capabilities for IT projects. • Support/champion on-line delivery of services to County residents. • Improve customer service.	• County's Affirmative Action Plan may be impacted by layoffs, reassignment of employees and job duties. The Commission will need to monitor the AAP as DMS prepares to submit new plan utilizing 2000 Census data. • As a regional service agency, the requirements made upon the Division increase as the County expands in population despite the reduction in unincorporated area through annexation by the County's cities. • An overall eroding CX tax based as a result of the decreasing unincorporated areas will make it increasingly difficult to fund increasing costs, particularly in the absentee voter program which now constitutes half of the voter population. Additionally, the State and Federal government does not reimburse the County for election costs in even-numbered year elections. • Will be increased pressure to "reform" election procedures and equipment. • Possibility that a mandated change in the operation of partisan primaries may add additional requirements for the primary in 2002. • There are no standards for LAN organization, support models, structures, tools, resources that are used today in the County. As a result, we see duplication of effort, inadequacies in key areas.		• Adopt or develop new data models for presenting legacy data to the Web that follow industry • Provide a data dictionary, to present to the Web user a view of all data and relationships in new data models. • Provide data storage for cases where data from multiple systems must be stored and recombined before accessing from the Web. • Provide scheduling capabilities to manage the movement of data. • All new applications should be built or purchased with a Web interface, if possible. If not possible, a Web interface should be added, as needed. • New special services, such as credit card payments and digital signatures should be used on the Web front end, not within the legacy application.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DES - Office of Civil Rights	• Ensure equal opportunity for all. • Establish collaborative working relationships with community organizations and County departments to ensure civil rights protection. • Work towards enhancement of quality of life for all, regardless of race, gender, sexual orientation, age, ethnicity or presence of a disability.	• Organizational restructuring • Community partnerships			
DES - Office of Cultural Resources	• Promote a system of regional and community cultural organizations, facilities and services to ensure access to high quality cultural opportunities for County residents. • Ensure that cultural values are reflected in regional policy, planning, and development. • Enhance the County's quality of place using tools of the cultural community such as historic preservation, public art, and community-building arts and heritage programs. • Support regional and local economic development through investment in cultural infrastructure, adaptive re-use of historic structures, and cultural tourism. • Provide regional leadership to suburban communities, arts and heritage organizations, individual artists and heritage specialists providing cultural services to County residents. • Be responsive, cooperative, timely and efficient in processing contracts, invoices and requests for information.	• Access to cultural programs. • Community investment. • Education and outreach. • Administration.		• Web site - applications and guidelines available on-line; Arts Electronic Newsletter; Current Gallery exhibits; "News." • Database – maintain extensive database of information about projects, organizations, individual artists, program funding histories. • Web site management – maintain web site, the Office's primary source of information, news and opportunities. • (Arts Commission Program) To focus on the potential of new technologies, and to define and implement initiatives that use technology to enhance KCAC service delivery and opportunities for constituents. • (Cultural Facilities Program) Develop new documentation standards to demonstrate the impacts of the Cultural Facilities Program on the public's access to heritage resources in every County community. • (Public Art Program) Artist Registry Program – Increase the number of private sector users by developing on-line access of all registries by end of 2001.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DES - Office of Cultural Resources				• (Public Art Program) Public Art Interpretive Materials – provide interpretive materials such as brochures, maps, on-line essays and articles to County residents and visitors; produce and track requests for brochures for all completed projects. • (Arts Commission) Link all contracting to OCR database and track program investment/public benefit by May, 2001. • (Arts Commission) Streamline contracting and database connectivity. • (Arts Commission) Have calendar of events in place on the Internet by February 2001.	
DES - Emergency Management Division	• Ensure continued effective operation of the E-911 system. • Promote regional emergency management by facilitating partnerships among business, public agencies and other organizations. • Provide positive and supportive work environment for fostering teamwork and customer service. • Ensure continued effective operation of the E-911 system.				
DES - Board of Ethics	• To prevent violations of the Code of Ethics through education, training, and information. • To ensure that the private conduct and financial dealings of public officials and employees presents no actual or apparent conflict of interest between the public trust and private interests.				

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DES - Board of Ethics	• To assure the public confidence of the impartiality and honesty of officials and employees in all public transactions and decisions.				
DES - Facilities Management Division	• Create informed, satisfied customers. • Foster development of a highly skilled, resourceful, flexible and productive work force. • Provide effective, efficient, and economical services and products. • Implement sound environmental practices. • Establish safe environments for employees and the public.				
DES - Finance Division	• Re-validate and confirm the program vision and its alignment with the County's short- and long-term goals. • Confirm sponsorship of the program vision among key stakeholders. • Confirm throughout the end-user community. • Establish a strong project governance structure. • Provide agencies with cost effective disbursement, financial and procurement services. • Maximize revenue collection and investment opportunities. • Ensure compliance with state, federal and local procurement laws and regulations. • Provide expertise/consulting services to all departments regarding accounting and financing strategies.	• Critical assessment of the County's Financial Systems Replacement Program (FSRP).		• Resolution of organizational barriers to FSRP program continuance and success. • Resolution of technical barriers to FSRP program continuance and success. • Alternative 2 which was identified in the Critical Assessment – Phased implementation of PeopleSoft HRMS Countywide and re-evaluation of core financials options.	• Opportunities for improving efficiency within or between agencies include more communication.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DES – Human Resources Division	• Champion employee success in the workplace. • Provide integrated human resources strategic services to support County departments in achieving their goals. • Lead and support organizational, policy and infrastructure change initiatives. • Deliver innovative and responsive human resources expertise, systems, and programs. • Change management processes to maintain reliable, efficient, legally sound, and cost effective databases and systems operated in support of the County. • To create summary analysis, workforce profile, and employee movement reports on a monthly basis. • Resolve lack of data consistency. • Resolve quality assurance handled through time consuming, manual data manipulation. • Resolve incomplete data in both payroll systems.			• Design, develop, and implement fundamental skill training in human resource administrative skills, manager/supervisor training and interpersonal skills. • Build capacity to do human resources strategic planning.	
DES - Licensing and Regulatory Services	• Increase public access to and awareness of a wide array of County services. • Promote/Facilitate compliance with laws and regulations to ensure public safety. • Provide quality animal control services to promote animal welfare. • Provide timely and cost effective mail services to internal customers. • Develop and support a motivated customer service oriented workforce.				

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DES - Records and Elections	• Use technology to help provide high quality, responsive customer service at reasonable costs. • Incorporate needs of customers, citizens, private companies and County departments in defining cost-saving efficiencies. • Develop/Support a workforce that can meet the changing needs of the Division.				
DES - Risk Management	• Resolve citizens' claims and lawsuits in a fair and expeditious manner. • Administer a risk financing plan to pay for and recover from losses, in order to meet the County's legal and fiduciary obligations. • Assist County agencies in minimizing the frequency and severity of losses. • Advise agencies on contractual matters to reduce potential liabilities. • Support, enable, and encourage a work force, utilized to their full potential, to provide the best risk management services possible.			• Obtain/Implement a risk management information system (RMIS)	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Judicial Administration (DJA)	• Promote a technology-based paperless court record. • Increase/Sustain court records and program management resources. • Build/Maintain a confident, skilled, and knowledgeable staff. • Serve customers by providing information and access to the court record.	• Specific to technology: • Acquisition, training, and retention of adequate numbers of technology staff for ongoing support of mission critical systems. • Training of technology staff in the strategic and operational business elements required for DJA to successfully implement its technology • FTE and other budget issues. • Working in synch with other Departments to implement data sharing.	• Accurate and complete records available to the Court and the public promptly. • Cost-effectiveness of services provided • Accurate record of "in-court" proceedings on minute sheets and accurate depiction of exhibit handling in the court. • Ease of access to records for all customers. • Understandability of programs and access methods for customers so they can easily obtain the information and services needed. • Specific to technology. • Implement technologies to process increasing volumes of filings by working smarter rather than longer, harder, faster. • Transform management of court filing documents from hardcopy documents to electronic imaged and digital documents. • Reduce departmental space needs. • Implement electronically automated workflows to reduce time from filing to availability. • Reduce overall staffing levels through business process reengineering. • Reduce foot traffic in DJA by making information and records available via self-service over the Internet. • Increase service levels by providing simultaneous access to court records by multiple parties. • Allow the filing of court documents over the Internet.	• Build on existing Electronic Court Records system, with phased projects of e-filing. • Update Random Judge Assignment and Case Scheduling software.	• Opportunities for improving efficiency within or between agencies includes LS&J integration.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Judicial Administration (DJA)			• Reengineer existing automation efforts to make them available to additional users (and in some cases to allow other computer programs to become "users" by providing APIs), enhance performance, and decrease maintenance costs. • Provide data, information, statistical analysis to enhance the courts ability to manage its caseload and to promptly and fairly administer justice.		
King County District Court					• Opportunities for improving efficiency within or between agencies include data sharing and electronic data transfer.
Dept. of Natural Resources and Parks (DNRP)	• Leadership: Be a high performance regional environmental management agency by providing high quality services, working in partnerships, and leading by example. • Environmental Quality: Achieve a net gain in environmental quality by protecting/restoring the natural environment, ensuring public safety, and exceeding environmental standards. • Waste to Resource: Regard region's waste products as resources and minimize amount of residual waste disposed. • Community Investment: Contribute to healthy communities by providing recreation, education, and sound land management.	• County has an e-business initiative, but no real idea of how best to apply e-business to what we do. • There are many workarounds being used to meet information requirements. We need to improve data management and finance and payroll systems need to be consolidated. • A better connection needs to be made between the development of business plans/new business initiatives and technology planning.	• The department is recognized as a resource and leader in addressing environmental issues in the region • Identified regional environmental problems are being addressed (DNRP initiates, facilitates, and/or participates in resolution). • New markets are developed for use of recycled and reclaimed materials and byproducts • Department rates that are reasonable and competitive. • Customers satisfied with the services and benefits they receive. • A forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving the DNRP vision	• Rating of our relationship with other local jurisdictions in the region. • Percent of population that identifies the County as providing regional environmental services. • Number of problems identified during the year for which action was initiated or taken. • Number of emerging business lines. • Number of new markets developed and utilized for recycled/reclaimed materials. • The number of (surveyed) county citizens taking individual environmentally friendly actions (purchasing choices, recycling, gardening, carwash, etc.). • Percent growth in DNRP rates and fees relative to the Consumer Price Index over the past ten years.	• Use the Windows 2000 Server migration to collapse multiple Windows NT account domains and an NDS tree into one Windows 2000 domain, improving data accessibility. • Move of the GIS Center to DNRP and consolidation of department GIS analysts facilitates the testing of new data and software management practices. • Department data management committee is seeking to standardize how environmental data is captured, managed and documented. • Continued development of Internet and intranet-based applications and information.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Natural Resources and Parks (DNRP)	• Price of Service: Price our services reasonably and competitively, while delivering the highest value to our citizens and maintaining safe and reliable systems. • Customer Satisfaction: Meet the needs of our customers and our natural environment through valued, high quality and responsive services. • Employee Involvement and Morale: Be a forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving DNR vision. • Data accessibility in the form of a DSS, Decision Support System is paramount to managing our business now and in the future.			• Percent of customers satisfied with the quality and responsiveness of the service or program. • Employee rating of management practices • Employee rating of the availability of resources to do their job. • Employee rating of work group relations and communication. • Employee rating of their own contribution to the organization.	
DNRP - Wastewater Division	• Leadership: Be a high performance regional environmental management agency by providing high quality services, working in partnerships, and leading by example. • Environmental Quality: Achieve a net gain in environmental quality by protecting and restoring the natural environment, ensuring public health and safety, and exceeding environmental standards. Waste To Resource: Regard the region's waste products as resources and minimize the amount of residual waste disposed. • Community Investment: Contribute to healthy communities by providing recreation, education, and sound land management.	• Make significant progress in implementing the recently adopted Regional Wastewater Services Plan (RWSP) capital program. • Respond to energy price volatility. • Respond to potential competition from the private sector. • Maintain a flat sewer rate for 2002 through 2004, as intended by the Council's recent rate action.	• Minimized public health problems from sewage and solid waste. • Increased recycling or reuse of our own facility byproducts. • Department rates that are reasonable and competitive. • Customers satisfied with the services and benefits they receive. • A forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving the DNRP vision.	• Productivity Initiative is a collaborative effort between management and labor to achieve significant cost savings in operating and building the wastewater treatment system while continuing to meet federal, state and local environmental regulations and goals. • Percent discharges conforming with NPDES permit limits for wastewater treatment and solid waste facilities. • Percent of bio-solids recycled and reused. • Amount of potable water use reduced through both conservation measures and reclaimed water use. • Percent of biogas reclaimed. • Comparison of wastewater rates with other agencies that provide comparable services.	

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DNRP - Wastewater Division	• Price of Service: Price our services reasonably and competitively, while delivering the highest value to our citizens and maintaining safe and reliable systems. • Customer Satisfaction: Meet the needs of our customers and our natural environment through valued, high quality and responsive services. • Employee Involvement and Morale: Be a forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving the DNR vision. • Data accessibility in the form of a DSS, Decision Support System is paramount to managing our business now and in the future.				
DNRP - Solid Waste Division	• Leadership: Be a high performance regional environmental management agency by providing high quality services, working in partnerships, and leading by example. • Environmental Quality: Achieve a net gain in environmental quality by protecting and restoring the natural environment, ensuring public safety, and exceeding environmental standards. • Waste to Resource: Regard the region's waste products as resources and minimize the amount of residual waste disposed.		• Involve all employees in the Competitiveness Initiative and develop specific objectives resulting from comparison of the Solid Waste Division with other solid waste agencies, both public and private. • Identify areas in which we are doing well, areas where we might want to expand, and areas where we can improve and use data gathered to track Division's performance over time. • Minimized public health problems from sewage and solid waste. • Increased recycling or reuse of our own facility byproducts. • Consistent reduction in the amount of waste needing to be disposed of	• Percent discharges conforming with NPDES permit limits for wastewater treatment and solid waste facilities. • Percent of methane produced by the Cedar Hills landfill that is converted to usable energy. • Percent of solid waste stream recycled. • Amount of waste being disposed. • Percent participation in recycling programs for residential and commercial activities. • Comparison of solid waste rates with other agencies that provide comparable services.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DNRP - Solid Waste Division	• Community Investment: Contribute to healthy communities by providing recreation, education, and sound land management. • Price of Service: Price our services reasonably and competitively, while delivering the highest value to our citizens and maintaining safe and reliable systems. • Customer Satisfaction: Meet the needs of our customers and our natural environment through valued, high quality and responsive services. • Employee Involvement and Morale: Be a forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving DNR vision. • Data accessibility in the form of a DSS, Decision Support System is paramount to managing our business now and in the future.		• Department rates that are reasonable and competitive. • Customers satisfied with the services and benefits they receive. • A forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving the DNRP vision.		
DNRP - Water and Land Resources Division	• Leadership: Be a high performance regional environmental management agency by providing high quality services, working in partnerships, and leading by example. • Environmental Quality: Achieve net gain in environmental quality by protecting/restoring the natural environment, ensuring public safety, and exceeding environmental standards. • Waste to Resource: Regard region's waste products as resources and minimize amount of residual waste disposed.	• Water and Land Resources Division faces a declining revenue base in the next few years due to the significant Current Expense Fund budget shortfall and to continuing annexations and incorporations eroding the drainage fee revenue base. • Division faces pressures for increased levels of services and new regulatory requirements from federal, state, and local environmental initiatives.	• Reduction in public safety issues related to flooding. • Improved watershed health • Citizens taking more positive actions to protect the quality of King County's environment. • Maintaining productive farm and forestlands in King County. • Farms and forests in King County being managed in an environmentally sustainable manner. • Department rates that are reasonable and competitive. • Customers satisfied with the services and benefits they receive.	• Amount of property damage during flood events. OR number of buildings in floodplain. OR Flood insurance rating. • Number of King County rivers, lakes, and saltwater bodies that fully or partially support their beneficial designated use. • Trophic State Index of King County Lakes. • Benthic Index of Biotic Integrity Score. • Percent of river/stream miles (or reaches) with high quality riparian habitat. • Percent of days monitored where stream temperature is within acceptable range.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DNRP - Water and Land Resources Division	• Community Investment: Contribute to healthy communities by providing recreation, education, and sound land management. • Price of Service: Price our services reasonably and competitively, while delivering the highest value to our citizens and maintaining safe and reliable systems. • Customer Satisfaction: Meet the needs of our customers and our natural environment through valued, high quality and responsive services. • Employee Involvement and Morale: Be a forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving DNR vision. • Data accessibility in the form of a DSS, Decision Support System is paramount to managing our business now and in the future.		• A forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving the DNRP vision.	• Number of wild salmon returning to spawn in their native streams (spatial distribution, number returning per class year etc.). • The conversion rate of farms/forests to non-resource based uses. • The amount of private and publicly owned resource lands receiving conservation treatment. • Comparison of surface water fees with other agencies that provide comparable services.	
DNRP - Parks Division	• Leadership: Be a high performance regional environmental management agency by providing high quality services, working in partnerships, and leading by example. • Environmental Quality: Achieve a net gain in environmental quality by protecting and restoring the natural environment, ensuring public safety, and exceeding environmental standards.	• The Parks Division is also faced with declining revenues at the same time that policymakers and the public expect to increase existing programs and service level. • The Division continues to be responsible for facilities that lie within cities, while the Current Expense Fund tax base has been eroded by annexations and incorporations.	• Parks, open spaces and recreation programs with a major focus on systems of open space corridors that conserve natural resources and provide recreation opportunities, fish and wildlife habitat, and scenic beauty. • Department rates that are reasonable and competitive. • Customers satisfied with the services and benefits they receive.	• Identify properties and facilities within incorporated cities that may be divested to cities over the next few years. • Identify new funding sources for maintenance and operations of parks and facilities. • Continue to pursue innovative revenue initiatives to sponsor specific programs and events. • Number of parks and recreational facilities transferred to cities. • Percent completion of ideal regional trail network.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DNRP - Parks Division	• Waste to Resource: Regard region's waste products as resources and minimize amount of residual waste disposed. • Community Investment: Contribute to healthy communities by providing recreation, education, and sound land management. • Price of Service: Price our services reasonably and competitively, while delivering the highest value to our citizens and maintaining safe and reliable systems. • Customer Satisfaction: Meet the needs of our customers and our natural environment through valued, high quality and responsive services. • Employee Involvement and Morale: Be a forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving DNR vision. • Data accessibility in the form of a DSS, Decision Support System is paramount to managing our business now and in the future.		• A forward thinking workforce where employees are engaged in our business, involved in decisions that affect them, and understand their role in achieving the DNRP vision.		
Prosecuting Attorney's Office (PAO)	• Shape the evolution of the justice system with fairness, accountability, and public safety. • Operate within a justice system that is efficient, effective and fair.	• The PAO has a small administrative component (less than 4% of the PAO's total employees) responsible for financial management, information systems, personnel, and general administrative.		• Adoption of a business plan to maximize efficiencies and encourage innovation, not just within the office, but within the entire justice system.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Public Health	• Provide needed or mandated health services and prevention programs to address individual and community health concerns. • Assess and monitor the health status of our communities. • Prevent disease, injury, disability, and premature death. • Control or reduce the exposure of individuals and communities to environmental or personal hazards. • Employ/Retain a skilled workforce that reflects the diversity of the community. • Provide for timely, consistent, and clear two-way communication tailored to individual constituent communities to assure that the citizenry is fully informed of what the government is doing. • By 2005, increase the Public Health System's ability to respond effectively to emerging environmental health issues and communicable disease outbreaks, without disruption of ongoing critical public health services. • By 2004, the public health workforce will be well trained and have the resources they need to achieve results that exceed recognized standards for quality and cost. • By 2005, residents of King County will understand and support public health priorities and actions. • By 2003, Public Health will have a sustaining and flexible funding base sufficient to maintain critical public health services.	• Environmental, demographic, social, epidemiological, and medical trends will demand an increasingly flexible and responsive public health system. Examples include: the aging of the populations; global trade and travel; emerging infections diseases; and more adverse health behaviors. • The increasing complexity of public health issues will require clear, understandable communication both internal and external to Public Health. Electronic and mass media messages greatly influence individual health behaviors. Public Health will need to modify many of its traditional health intervention efforts. • There will be an increasing demand for Public Health to respond in partnership with others to improve the health of the community. Public Health is challenged to align its prevention activities, policy initiatives, and services with its community-based public health practice. • Continued erosion of local tax authority will make it increasingly difficult to develop a long term, stable funding base and political consensus. • The growth of low income and uninsured population, combined with resource limitations and inequities, create challenges to Public Health to assure comprehensive public and personal health services to all populations in need in the County.			• Opportunities for improving efficiency within or between agencies includes improve procurement of larger items, recurring contracts, consulting contracts, etc. • Improve customer server, communication and inter-agency cooperation between ITS and IT sub-units.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Public Health	• By 2003, Public Health will increase the number of collaborative partnerships that have a high likelihood of reducing regional disparities in health status. • By 2005, the health impact of diabetes and childhood asthma will be reduced.	• Public Health will be increasingly challenged to assure population-based and comprehensive personal health services while trying to meet the increased resources demands of incarcerated, homeless and other "marginalized" populations. • Public Health's infrastructure, including data management, financial management, and human resources, will need to improve dramatically, in order to provide cost-effective and customer focused services. • Even with limited funding and a fragile infrastructure, the Department must address dramatically increased workloads while also improving productivity. Employees will need significant training and support to avoid "burnout, retain staff" and to maintain quality.			
Executive - Office of Regional Policy and Planning	• Regional planning.	• Regional planning.		• Technical assistance to small businesses.	
Sheriff's Office	• Reduce crime and the fear of crime. • Provide high quality, cost-effective, and accountable services to County citizens and to contract cities. • Commit to community policing at all levels of the Department to positively affect police response times and other important policing services.	• After 2002, potential annexations could reduce the unincorporated population to the point that customer base is composed primarily of contracts. • Crime response, investigation, and prevention. • Contract service provision. • Technological development. • Employee and citizen services. • Resource and facility management.		• Technological development – use and develop technology for investigating crimes, tracking crime information, and improving business systems to better utilize information for addressing crime and serving citizens (Incident Reporting and Investigating System (IRIS)) application development complete 3-02).	• New market opportunities are increasingly limited, but pose significant potential since they include transit operations, schools, and regional partnerships. • Develop a service delivery model that used technology to make deputies more efficient and effective so that they have time to interact with the community and solve problems (community oriented policing). • Develop information delivery portals (See objectives) to provide the right information to the right people at the right time.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Sheriff's Office				• Technical Services Division provides the bulk of support services that are vital to efficient operations (Communications, Automated Fingerprint Identification System (AFIS), contract Services, Administrative Services, Budget and Accounting, and Planning, Analysis, Records, & Technology). • Investments in technology will help the agency meet future demands; information gathering is highly automated; more reporting functions are being built; more reliable and thorough data sources improve long range planning and feedback to our customers, as well as research capabilities to support grant requests. The ability to quickly gather data and information will assist in long-range planning, identifying problems, and finding solutions; information could also help the KCSO secure grant funding for future efforts. • Use of IRIS system CAD switchboard, and increasing use of web technology allows department members to get a broad range of information quickly to make more informed decisions. • IRIS development project complete 3-31-02. • Devote staff time to administer the bulletin system, maintain the web site, and function as leaders of the regional information sharing team.	• Improve technology-enhanced workflows to make deputies more efficient and effective so that they have time to interact with the community and solve problems (community oriented policing).

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Sheriff's Office				• Encourage the KCPCA to create a vision for structured/tabular data and develop a strategic plan for a comprehensive integrated regional information system. • Centralized crime analysis system allows customers to run their own investigative queries through an intranet or request assistance from specially-trained analysts. • Work on feasibility research and funding sources to develop a system of wireless communication so that information can be shared on-demand with patrol deputies, allowing deputies to access local and regional databases, as well as King County Sheriff's Office information. • Records Management – process improvement project completed on 12-31-02 which analyzed former work practices, eliminated unnecessary steps, standardized practices, and developed system measures that enabled supervisors and managers to monitor their team's quality and productivity. • Focus on developing an improved staff performance evaluation process.	
Superior Court	• Adjudicate legal matters timely and expeditiously. • Provide access to court services to litigants, jurors, witnesses and the public. • Provide programs and services required by law and/or court rule.	• Demand for justice system performance accountability. • A growing shortage if court administrators and staff. • Rapidly emerging information, telecommunications, and networking technology. • County budget reductions.		• With creation of the Chief Administrative Officer position, superior Court and the Department of Judicial Administration anticipate improved coordination in areas such as technology and administrative services. • Courthouse wiring project.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Superior Court	• Foster public trust and confidence in the judicial system. • Redefine the primary user of SC information systems as the PUBLIC. • Manage risk by developing systems in short cycles and distributing technology portfolio. • Use highly interactive business-technical teams. • Incorporate Court best practices.				
Dept. of Transportation (DOT)	• Provide integrated Countywide public transit and roads services, products and facilities that are safe, reliable, convenient and efficient. • Be active regional partner by working with others to develop/carry out transportation plans and services that support mobility, accessibility, land use and growth management. • Promote employee involvement in an effective workforce that reflects the diversity of the community. • Provide timely, consistent and clear two-way communication tailored to the transportation needs of the customers and citizens that are served. • (Road Services Division) Develop cutting edge applications in information technology in areas of GIS mapping, roadway conditions reporting and other systems for gaining efficiencies. • (Airport) Install programs and data in automated maintenance management system (AMMS).	• Area economic growth. • Aerospace industry. • Pattern of employment. • Population growth. • Inter- and intra-County commuting • Demographics. • Gasoline prices and auto use. • Transit and vanpool ridership outlook • Ongoing program funding (I-695, Sales Tax, Fares, Grants).		• Develop and implement a plan to optimize investments in appropriate transit technology. • Monitor indicators of technical and financial performance. • Work with partners in the region on fare integration. • The Six-Year Transit Development Plan for 2002-2007 (The Six-Year Plan) will set forth objectives and strategies for transit, paratransit, rideshare services and supporting capital facilities in King County, and will establish the policy basis on which annual operating and capital program decisions will be made. The plan will serve as an implementation guide intended for update as changing conditions or priorities dictate. • New scheduling software for paratransit implemented in 2000. • Develop systems that will track and record all incoming citizen requests and complaints.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
Dept. of Transportation (DOT)	• (Airport) Develop of Facility Management Database (GIS). • (Airport) Improve and maintain web site to improve customer response. • (Airport) Assure airport accounting is performed in accordance with GAAP and Federal, State and County guidelines.			• Have maps and records preserved through restoration and conservation techniques so that they can be stored in an electronic format for accessibility via Internet and intranet. • Increase use of website • Maintain technical ability at a sustainable threshold (Engineering Technical Support Services). • Provide division-wide coordination in the implementation of personnel policies procedures and practices. • Develop annual workplace assessment survey; benchmark data to assess work environment from which future goals are established. • Train employees to meet current and future needs, and recognize individual and team accomplishments. • Completion of new accident inventory database to use in evaluating accident numbers, types, patterns, and conditions for the identification of safety programs. • The public has access to video of traffic conditions through the County's web page at 8 locations.	
DOT - Roads Services Division	• Transportation solutions. • Travel safety. • Customer service and satisfaction. • Efficiency and cost effectiveness. • Environmental responsibility. • Employee motivation and pride. • Divisionwide IT coordination				• Opportunities for improving efficiency within or between agencies includes coordination meetings, shared staff resources, loaned staff resources, better communication and sharing of IT ideas, technology summits, brown bag sessions, industry expert lectures.

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DOT - Roads Services Division	• Lead/Facilitate divisionwide IT coordination. • Lead/Facilitate development and implementation of IT improvements. • Provide outstanding customer Services. • Lead/Facilitate Divisionwide IT coordination. • Lead/Facilitate development and implementation of IT improvements. • Provide outstanding customer services.				
DOT - Transit Division	• Provide quality products and services. • Be an active regional partner. • Be an outstanding place to work. • Safety and security. • Reliability. • Customer convenience. • Responsiveness. • Efficiency. • Regional service integration. • Increase visibility of the section's products as critical element of region's "intelligent" transportation services. Develop integrated information systems within Transit, DOT, County, and region to facilitate the provision of "one-stop" service for customers requesting alternatives to single occupancy vehicle (SOV) travel.	• Expansion of service. • Regional integration. • Technology changes. • National standards for intelligent transportation systems. • Responsible government spending and asset management. • Oversight of on-board systems. • Degree and phasing of on-board integration. • Better service level agreements needed with ITS for help desk support. • Better collaboration on strategic planning efforts.	• Community and customer responsiveness. • Ensure financial well being • Increase ridership. • Forge regional partnerships. • Implement integrated multimodal plans. • Improve environmental quality. • Improve pour organization's culture.	• Maintaining existing infrastructure and investments. • Procuring products that best match the division's business needs. • Using applicable standards. • Participating in partnership projects that provide external funding. • Maintain and fund asset maintenance and replacement programs for hardware and software. • Periodically revise standards/guidelines for hardware and software purchases including desktop equipment. • Consolidate servers and server support. • Meet national technology architecture standards on all new systems. • Leverage technology investments by developing evolutionary deployment plans that build upon previous investments in technology. • Encourage pilot, prototype, and phased implementation projects to reduce risks.	• Opportunities for improving efficiency within or between agencies includes use of central groups as resources to client departments. • Recognize differences between County agencies and that "one size doesn't fit all."

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DOT - Transit Division				• Where appropriate, include a functional testing and benchmarking phase prior to contract award to better ascertain system functionality and whether vendors have a deployable product. • Develop and implement a model for conducting a project evaluation stage following implementation of key new or upgraded information technology systems. • Review hardware, application software, network, and database architecture for the most efficient ways to integrate and maintain information systems distributed among multiple business areas. • Leverage Transit funding by pursuing partnerships with federal, state, and local governments and private sector companies. • Attract/Retain qualified technical staff. • Examine opportunities presented by technological advancements used by other industries, such as wireless communications and the Internet. • Establish working groups to provide cross-project coordination in such areas as On-Board Systems and Customer Information. • Establish a quality assurance methodology to guide new systems development and change management for system support. • Internet-mediated information.	

Agency	Goals	Strategic Issues	Objective	Directions	Opportunities
DOT - Transit Division				• Enhance the accessibility of the Metro online web site by redesigning the way Metro online web pages are created. • Development of customizable customer mapping tools. • Implementing a customer-operated online itinerary planning system. • Better data from on-board systems integration. • Radio communications.	

III.   Needs Summary

A. *Introduction*

Needs have been compiled from individual interviews with TMB and BMC members, agency documentation, business plans, agency surveys, agency inventories, and general fact finding efforts. The results of this input have been aggregated into this Needs Summary and organized into the following categories:

- Service Delivery
- Operations
- Architecture
- Management and People
- Funding

Each category addresses one or more summary level needs from the detailed needs listings that were identified as themes across agencies. Source(s) for the needs are noted beside each item. Note these are summarized needs and as such, were identified through multiple sources. Needs identified within this document are addressed in Sections V (Technology Environment) and VI (Strategies) of the strategic technology plan.

B. *Summary Needs*

1. Service Delivery

Service delivery involves providing a wide variety of functions directly to end users. Resources being utilized range from the staff involved, to processes and procedures, to work methods and development tools. Service delivery occurs throughout the entire technology lifecycle for each of the County's systems; that is, during development, implementation, operations, and maintenance activities. Proactive service delivery, help desk support, end-user training, and service-level commitments were common needs identified within the review and are addressed below.

a) *Proactive Service Delivery*

The overall service delivery approach needs to be from a proactive position. Being proactive means staying current with work loads, knowing how systems are performing, determining ahead of time what systems are, or will be, underperforming and taking corrective action. Being proactive also means understanding the client situation and future client needs to direct services accordingly.

NEEDS
• Review and identify any barriers to proactive service delivery [Sources: Business Plan, Interviews, Survey]

b) *Help Desk Support*

A centralized enterprise help desk has been established. This help desk supports approximately 10,000 users. The supporting software is Heat, which has been heavily customized.

NEEDS

- Capability to generate reports and query the help desk database. [Source: Interviews, Survey]
- Ability to follow-up on assigned tickets. [Source: Interviews]
- Clear escalation and resolution roles/responsibilities. [Source: Interviews]
- Coordinated agency-level help desk tools. [Sources: Interviews, Survey]
- Centralized/Integrated help desk function. [Sources: Interviews, Inventory]
- Robust reporting on service levels, performance, and workload. [Source: Interviews]
- After-hours support. [Source: Survey]
- Trained/Knowledgeable help desk staff. [Source: Interviews]

c) *End-User Training*

End-user training for staff is limited. Lack of funds for training has left employees to rely largely on on-the-job training with little opportunity for additional learning outside of the agency.

NEEDS

- Training plans and budgets. [Sources: Interviews, Survey]
- Targeted training on MSA. [Source: Survey]
- Bonus/Incentive program to reward training efforts. [Source: Interviews]

d) *Service- Level Commitments*

Service-level commitments allow agencies to implement service quality, quantity, cost and cost measurement standards for vendor relationships, apply a review process and implement quality assurance programs.

NEEDS

- Formal agreements between all agencies and the ITS help desk. [Source: Interviews]
- Agreement standards that specify response time. [Source: Interviews]
- Formal agreements with all vendors. [Source: Interviews]

2. **Operations**

Operations includes those activities required to keep the County's systems running on a day-to-day basis. This includes the establishment of standards, controlling and managing data and applications, and ensuring that systems are operational. Within King County, several areas of concern within Operations include the need to address unattended business functions, the need to establish standards across agencies, and the need to develop data management tools.

a) *Unattended Business Functions*

Due to a variety of issues, a number of essential business functions have not received resource or focus.

NEEDS

- Asset management [Source: Interviews]
- Disaster recovery [Sources: Interviews, Inventory]
- Security [Source: Interviews]
- Server planning [Source: Interviews]
- Application design concurrent with customer needs [Source: Interviews]
- Bill auditing [Source: Interviews]
- Designing for cost avoidance [Source: Interviews]
- Voice mail systems [Sources: Business Plan, Interviews]
- An overall plan with deliverables, milestones, budget, and responsibilities for each area above. [Source: Interviews]

b) *Standards*

From an operational perspective, standards for procedures are needed. Standards allow the organization to take advantage of the inherent efficiencies that a large organization has the opportunity to achieve.

NEEDS

- Established standards in each of the following areas

  → Documentation [Sources: Interviews, Survey]
  → Security [Source: Interviews]
  → Maintenance [Source: Interviews]
  → Disaster recovery [Sources: Interviews, Inventory]

c) *Data Management*

Two issues currently face the County in regard to data management. These include the lack of planning and coordination around the establishment of an enterprise-level data management plan, and secondly, the lack of data ownership. Data ownership defines who is ultimately responsible for maintaining the integrity of the data (determining who has access to the data, how the data can be used, etc.).

NEEDS

- Creation of an enterprise-level data management plan. [Sources: Interviews, Inventory]
- Cross-agency coordination of data and information management. [Sources: Interviews, Inventory]
- Defined roles and responsibilities for data ownership. [Sources: Business Plan, Interviews, Inventory]

3. **Architecture (web, applications, and infrastructure)**

Architecture is the overall design and structure of a system. This includes the hardware and software required to run the system. Architecture therefore incorporates needs related to applications, hardware, network, e-commerce/e-business, integration/ connectivity, legacy systems, data warehousing, telephone, voice mail unified messaging, wireless, operating systems, databases, middleware, user interfaces and voice, data, and video convergence. Within this area, a number of needs were identified related to the areas identified above. These are discussed in more detail below:

a) *Financial Systems*

Finance utilizes two separate financial systems including IBIS and ARMS to support the County's agencies. In some cases, both IBIS and ARMS are utilized to support a single agency. Additionally, neither system is considered current and risks losing support from the vendor.

NEEDS
• Single, enterprise financial accounting system. [Sources: Interviews, Inventory] • Current vendor-supported financial system. [Sources: Interviews, Inventory] • Capability to easily generate management reports from the finance system. [Sources: Interviews, Survey] • Ad-hoc reporting responsibilities. [Sources: Interviews, Survey]

b) *Human Resource/Payroll Systems*

Human Resources maintains two primary systems. These systems are PeopleSoft and MSA. In addition to these systems there are a number of ancillary databases and specialized systems to support additional needs. These systems include Signa, OPAC, pararisk, and CAMS.

NEEDS
• Single, enterprise human resource/payroll system. [Sources: Interviews, Inventory] • Streamlined human resource procedures. [Source: Interviews] • Ability for employees to be transferred between agencies. [Source: Interviews] • Streamlined human resource maintenance procedures. [Source: Interviews] • Human resource reporting capabilities. [Sources: Interviews, Survey]

c) *Law, Safety, and Justice*

The Law, Safety, and Justice system is comprised of a number of discrete systems that individually meet a variety of different needs. Over time, the focus has been on developing additional localized systems rather than devoting resources toward improving existing applications. However, as this system continues to age, support available from mainframe programmers will diminish as those skills become less available in the marketplace. While it is not necessary for the County to replace this system immediately, the County needs to give consideration to the long-term plan for this system. This plan should include opportunities for standardization as well as a focus on centralization.

NEEDS

- Short- and long-term plans for addressing LS&J systems migration. [Sources: Business Plan, Interviews]
- Integration plans. [Sources: Business Plan, Interviews, Inventory]
- Standardized data, tools, and processes. [Sources: Business Plan, Interviews]
- Centrally managed systems. [Sources: Business Plan, Interviews]

d) *GIS*

GIS supports essential functions within the County including public health, elections, transportation, permitting, utilities, assessment, and taxation. Prior to April of 2001, the GIS organization was split among different agencies. In April of 2001, the County combined these various areas into one GIS organization under the Department of Natural Resources and Parks.

NEEDS

- Integration between GIS and non-GIS systems. [Source: Interviews]
- Documented and enforced GIS standards. [Source: Interviews]
- Integration between legacy and GIS databases. [Source: Interviews]
- GIS data warehouse. [Source: Interviews]

e) *Document Management*

Document management tools automate and streamline storing and retrieving records. There is no Countywide document management tool in place.

NEEDS

- Streamlined document retrieval process. [Sources: Business Plan, Interviews]
- Ability to share information between agencies. [Sources: Business Plan, Interviews, Survey]
- Tool for tracking documents. [Source: Interviews]

f) Legacy Systems

Legacy systems are those that are aging, based on older technology platforms, and/or built to support non-current business processes. A number of legacy systems are in place at the County. These include, but are not limited to, ARMS, IBIS, and MSA.

NEEDS
• Upgrade and migration plan for all legacy applications. [Sources: Business Plan, Interviews, Inventory]
• Prioritization of legacy systems to be replaced in the short term. [Source: Interviews]

g) Documentation of Existing Applications

Documentation stands as a record for technical staff and end-users denoting the correct maintenance and use for systems. Many of the County's systems lack such documentation. Where it exists, it is often incomplete or non-current.

NEEDS
• Improved documentation of specialized systems. [Sources: Business Plan, Interviews, Inventory]
• Specified policies, procedures, and processes related to system use. [Sources: Business Plan, Interviews, Survey]

h) Improved Integration Between Systems

System integration speaks to connections between systems that hold and process related and/or redundant information.

NEEDS
• Coordinated systems development. [Sources: Business Plan, Interviews, Survey]
• Identification and prioritization of integration points between systems. [Sources: Interviews, Inventory]
• Plan for implementing identified system integrations. [Sources: Interviews, Inventory]

i) Planning and Design

Planning and design efforts seek to break down and identify the tasks and components needed to deliver specified functionality.

NEEDS
• King County needs short- and long-term plans in the following areas:
→ Web [Source: Interviews]
→ System integration [Sources: Business Plan, Interviews, Inventory]
→ Infrastructure [Sources: Interviews, Inventory]
→ I-NET [Sources: Business Plan, Interviews]

j) *Cabling Standards and Upgrades*

King County does not appear to enforce a standard cabling requirement. A variety of cabling currently exists within various facilities and across all agencies. Cabling currently includes CAT 3, 4, 5, 5e along with fiber and coaxial.

NEEDS

- Cable upgrades are needed in the following locations:

  → Cat3 cables in Courthouse and 10th floor of Bank of Cal. Bldg need to be upgraded to Cat5. [Sources: Business Plan, Interviews, Inventory]
  → Motor pool garage and building F, G, and J at the Renton consolidated maintenance facility. [Sources: Business Plan, Interviews, Inventory]
  → King County Correctional Facility and Youth Services Center. [Sources: Business Plan, Interviews, Inventory]
  → Regional Justice Center [Sources: Business Plan, Interviews, Inventory]
  → A set of cable infrastructure standards that speak to all aspects of structured cabling. [Sources: Interviews, Inventory]
  → Overall cabling needs include centrally managing cable standards. [Source: Interviews]

k) *Telephony*

Countywide standards are not currently in place for phone or voice mail systems. This prevents the integration of phone and voice mail systems across agencies. Additionally, current technology cannot be supported by some of the older telephony systems.

NEEDS

- Improving performance of phone system. [Sources: Interviews, Survey]
- Countywide telephony standard. [Sources: Interviews, Inventory]
- Telephony features such as skill-based routing, IVR, and CTI. [Source: Interviews]
- A voice messaging system that is able to deliver state-of-the-art application solutions. [Source: Interviews]
- A detail recording capability to enable agencies to manage any system abuse of long distance calling or to measure call activity by group or individual. [Source: Interviews]

l) *Hardware Standards*

Standards for hardware and purchasing are not in place. Lack of hardware standards increases support costs and complicates software upgrades.

NEEDS

- Countywide hardware standards. [Sources: Interviews, Inventory]
- A mechanism for enforcing standards. [Sources: Business Plan, Interviews, Survey]

m) *Internet/Intranet Access*

Internet and intranet technologies are used to enhance employee and public access to County data.

NEEDS
• Better linkages between agencies. [Sources: Interviews, Survey] • Access to more "real time" data over the web. [Sources: Interviews, Survey] • Capabilities for publishing directly to the Internet. [Sources: Interviews, Survey] • Proactive Internet/intranet planning processes. [Source: Interviews] • Web applications policy. [Source: Interviews]

n) *Upgrade and Replace Dated Systems*

The County maintains a number of outdated legacy systems. The Pulsepoint system, AN07, general software applications, and mainframe shortcomings were all specific points of interest in this regard.

NEEDS
• Update or replaced dated systems. [Sources: Business Plan, Interviews, Inventory] • Integrate standalone applications. [Sources: Business Plan, Interviews, Inventory] • Applications that are compliant with national and current market and standards. [Sources: Interviews]

o) *Server Capacity*

Servers store data and applications used and accessed over the County's network. Current server capacities for some agencies are inadequate. The Superior Court and Department of Transportation also indicated that additional server capacity is inadequate and that faster processing capabilities are needed.

NEEDS
• Upgraded capacity for the Office of Public Defense, Superior Court, and Department of Transportation. [Sources: Interviews, Inventory] • Faster processing capabilities for Superior Court and Department of Transportation. [Sources: Interviews, Inventory]

4. **Management and People**

Management and People focuses on leadership within the organization, span of control/chain of command, privacy and security, standards, ongoing planning, business analysis, staffing levels, expertise, and skills. Common themes identified that fall under the Management and People category include the need for strengthened leadership and management, technician training, staff retention and coordination between agencies.

a) *Strengthened Leadership and Management*

Leadership and management are at the helm of the organization.

NEEDS

- Access to information regarding customers' changing needs. [Sources: Business Plan, Interviews, Survey]
- Capability to synchronize technology advances with the County's evolving governance structure. [Sources: Business Plan, Interviews]
- Management-led changes to business practices and technology projects. [Sources: Interviews, Survey]

b) *Technician Training*

Even though there are very capable technology employees working hard to address the immediate technology needs of the County, the focus has been on maintaining existing systems rather than developing and implementing newer, state-of-the-art systems with market standard technologies.

NEEDS

- Employee training plans. [Sources: Interviews, Survey]
- Targeted training in current market technologies, leadership, project management, and business analysis. [Sources: Interviews, Inventory]

c) *Staff Retention*

Employees are a core investment for the County, and there are legitimate concerns that this resource is at risk due to competition for technical skills in the market.

NEEDS

- Continuity of knowledge and maintenance of County systems. [Source: Interviews]
- Capability to attract and retain staff. [Sources: Business Plan, Interviews, Survey]
- Competitive pay scales. [Source: Interviews]
- Review of compensation levels. [Source: Interviews]

d) *Agency Coordination*

Given the inter-related functions that occur across agency boundaries, there is a clear need to strengthen coordination regarding communication, processes, plans, systems, databases, and standards. Many agencies have overlapping goals and objectives, opportunities for shared services, and the potential to take advantage of economies of scale.

NEEDS

- Coordination of Roads' databases. [Source: Interviews]
- Asset management tools/audits. [Sources: Interviews, Inventory]
- Clear communication mechanisms between ITS and agencies. [Sources: Interviews, Survey]

5. **Funding**

Funding is the allocation of revenue for specific projects and agencies. Providing adequate funding within the County is a critical issue. Five general needs were established in regard to County funding. These include funding for CX agencies, the need for new and creative sources of funding, the need for more detail within budgets, and scenario modeling.

a) *Funding CX Agencies*

CX agencies are not positioned with adequate resources to fund either technology development or ongoing deployment. As a result, these agencies maintain dated and obsolete systems including thousands of outdated desktops and software applications.

NEEDS

- Adequate and reliable technology funding. [Sources: Interviews, Survey]
- Resources to enable deployment of current technologies. [Source: Interviews]

b) *New and Creative Sources of Funding*

The County is challenged by decreasing revenue sources at a time when new technologies and infrastructure are needed.

NEEDS

- Alternatives for new revenue sources. [Source: Interviews]
- Planned and balanced source for funding capital and operations expenditures. [Source: Interviews]

c) *Budget Detail*

Current budgeting processes focus on summary agency budgets and do not include technology specific detail.

NEEDS

- Ability to assess cost versus benefit of projects within and across agencies. [Source: Interviews]
- Capability to identify opportunities for realizing efficiencies. [Source: Interviews]

d) *Scenario Modeling*

The County is currently not able to run budget to actual comparisons or current year to previous year comparisons from a centralized budgeting system. In the past, actual data was loaded from ARMS and IBIS to provide year to date versus budget analysis and reports. This effort was determined to be extremely cumbersome and time consuming and no longer occurs. The County does coordinate and develop a quarterly actual to fund/source report based on input from each agency, however there is no way to verify the accuracy of data reported.

NEEDS

- Modeling capabilities to monitor agency and Countywide budgets. [Source: Interviews]
- Processes/Tools to enable budget reporting from a centralized budgeting system. [Source: Interviews]

IV. Technology Inventory Summary _____

One of the initial efforts of the strategic planning process included conducting an inventory of the existing technologies in place throughout the County. This information was gathered via an electronic survey that was distributed to the TMB members. Information was collected in seven categories as follows:

- Network Infrastructure
- Operating Systems
- Software/Applications
- Backup Processes
- Internet
- Staffing
- Telephony

Agencies participating in this process included:

- Department of Assessments
- District Court
- Council
- Department of Natural Resources
- Department of Judicial Administration
- Finance
- DCHS – Office of Public Defense
- Department of Adult and Juvenile Detention

- Sheriff's Office
- Department of Development and Environmental Services
- King County Executive – OHRM and OCR
- Office of the Prosecuting Attorney
- DOT – Road Services

- DOT – Metro Transit
- Department of Public Health
- DOT – Fleet Administration
- Superior Court
- International Airport
- Department of Information and Administrative Services

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
TECHNOLOGY INVENTORY					
I. *Network Infrastructure*					
A. Network Overview					
Summary					
1. Indicate which network type(s) are in place at your agency					
Client server	Yes	No	Yes	Yes	Yes
Peer to peer	No	Yes	No	Yes	Yes
Other	No	No	No	Yes	No
If other, please specify.				Intranet	
2. What network protocols are in place?	TCP IP	TCP/IP	IP	TCP/IP IPX DECNET Appletalk	IP
3. What network topologies are used?					
Ethernet	Yes	Yes	Yes	Yes	Yes
Token ring	No	No	No	No	No
Other	No	No	No	No	No
If other, please specify.					
4. What network operating systems does your agency use?	Windows NT	Servers: Microsoft NT 4.0 domain controllers Microsoft Windows 2000 Server member servers	Windows NT 4.0, Windows 2000	Windows NT 4 Windows 2000 Novell NetWare Unix	NT 4.0
B. Cabling					
1. Does your agency use a mix of cable types?	No	No	No	Yes	Yes
2. Is a cable upgrade needed?	No	Yes	No	Yes	No
Describe.		Cat 5 cabling went in prior to joining the WAN.		Need to upgrade from coax to cat5e at some small remote sites	
Detail					
1. Indicate what percent of cabling used to support your network falls into each of the following categories:					
CAT 4			100		
CAT 5 or 5e	100			88	
CAT 6				10	
Fiber optic				2	

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
2. Are any systems certified?	No		No	No	No
If yes, provide the name and manufacturer for each system that is certified.					
System Certified					
Manufacturer					
C. Servers					
Summary					
1. Indicate total number of servers used by your agency in each of the following categories.					
Web	1		1	2	2
Communications					0
Production	1			14	8
Text				14	0
Reporting				14	0
Print	2	6		23	3
Development	1			3	2
Data	2	5	4	14	7
Backup	2			15	2
Application	2			10	3
Other				15	0
If other, please describe.				4 are DHCP server 11 are cash drawer/weigh scale systems at solid waste transfer stations	
2. List the type and location of servers below.					
Type	6 servers are WIN NT	NT 4.0	Windows NT	Windows NT 4	NT4.0 PDC Apps/Data/Print
Location	Admin bldg (KCAB)	KCCH, 3rd Floor	King County Courthouse	28 different sites	KCCH
Type	1 win 2000	NT 4.0	Windows 2000	Windows 2000	NT4.0 BDC
Location	KCAB	Bellevue Div	King County Courthouse	King St Ctr, Cedar Hills	KCCH
Type	2 Win NT	Windows 2000		Novell NetWare	NT4.0 BDC Data/Print
Location	Renton	Bellevue		King St Ctr, Cedar Hills	RJC
Type		Windows 2000		Vax	NT4.0 IIS
Location		Northeast Div.		South Treatment Plant	Key Tower
Type		NT 4.0		Macintosh TCP/IP	NT4.0 SQLServer/FileNet/Data
Location		Northeast		King Street Center	Key Tower
Type		NT 4.0		Unix	Nt4.0 App/data
Location		Renton		King St Ctr, Env. Lab	KCCH

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
Type		NT 4.0			NT4.0 App/Data/SQL/IIS
Location					RJC
3. Is your current capacity adequate?	No		Yes	Yes	Yes
If no, describe.	Lack of tape backup capacity, lack of adequate disk storage for images & user data. EISA motherboards in Seattle 2 & sonics do not have any PCI slots for Fast				
4. Of the total servers listed, how many require upgrading?	4		1	22	0
5. How many updates are planned in each of the following years?					
2002			1	16	0
2003				6	0
2004					0
6. How many replacements are planned in each of the following years?					
2002				11	2
2003	1			13	1
2004				6	1
Detail					
1. List each server being used and provide information associated with it on the attached work document.					
D. Network Hardware					
Summary					
1. Describe any key issues/challenges/ problems with existing hubs, routers, switches, etc.				Network switches near capacity on the 5th floor of King Street Center Fiber-copper cabling interface at Cedar Hills.	The LAN Administrators can't get access to the switches at the RJC, not even for emergency purposes. ITS does not have a staff person dedicated to the RJC 5 days a week to support the switches if problems occur.
Detail					
1. List each piece of hardware in place at your agency and provide information associated with it as listed.					

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
E. Peripheral Devices					
<u>Summary</u>					
1. Total number of printers in place:			90	212	70
Locations:	6 at Renton production 20 in KCAB production 5 waiting to surplus		King County Courthouse, Bank of California, King County Administration building, other locations.	63 different locations	KCCH (King County Court House in Seattle) RJC (Regional Justice Center in Kent) JUVY (Juvenile Detention Center in Seattle)
2. Total number of scanners in place:	3		5	12	20
Locations:	2 KCAB 1 Black River		See above.	6 different locations	KCCH RJC JUVY
3. Total number of fax machines in place:	5				6
Locations:	4 at KCAB 1 at Renton			Unknown, our IT staff does not administer fax machines	KCCH RJC JUVY
4. Total number of modems in place:	0			0	0
Locations:			King County Courthouse		
<u>Detail</u>					
1. List each peripheral device in place at your agency and provide information associated with it as listed on the attached word document.					
F. Workstations					
<u>Summary</u>					
1. Number of workstations in place within your agency:	274		180	1765	300
2. For each type of workstation utilized, provide the quantity, type, number per year that are anticipated to be replaced, and the operating systems.					
Quantity	5 Micros		180	130	32
Type	Desktop P166		Desktop computers	Macintosh	Gateway 2000 PII 400mhz
Anticipated replacement quantity for 2002	5		0	10	0
Anticipated replacement quantity for 2003			0		32
Anticipated replacement quantity for 2004			120		0
Operating system	NT Workstation		Windows 2000	9.04 - 9.2.1	W98/NT4.0

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
Quantity	32 Armada 1700			1280	4
Type	Laptop P300			PC's	Compaq PIII 500mhz
Anticipated replacement quantity for 2002	16			300	0
Anticipated replacement quantity for 2003	16			300	4
Anticipated replacement quantity for 2004				300	0
Operating system	NT Workstation			Windows 95/98	NT4.0
Quantity	20 Compaq Deskpro			325	4
Type	Desktop P166			PC's	Compaq PII 350mhz
Anticipated replacement quantity for 2002				100	0
Anticipated replacement quantity for 2003	20			100	4
Anticipated replacement quantity for 2004				100	0
Operating system	NT Workstation			Windows NT/2000 Pro	NT4.0
Quantity	20 Compaq Deskpro			30	4
Type	Desktop P166			Notebooks	Gateway 2000 PII 266
Anticipated replacement quantity for 2002				8	4
Anticipated replacement quantity for 2003	20			8	0
Anticipated replacement quantity for 2004				8	0
Operating system	NT Workstation			Windows 95/98	W98
Quantity	3 Compaq Prolinea 575				21
Type	Desktop P180				Gateway 2000 PII 333mhz
Anticipated replacement quantity for 2002	3				21
Anticipated replacement quantity for 2003					0
Anticipated replacement quantity for 2004					0
Operating system	NT Workstation				NT4.0

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	**Hoang Nguyen**	**Cathy Grindle**	**Paul Gaskill**	**Gary Hocking**	**David Baker**
Quantity	4 Gateway 2000				9
Type	Desktop P200				Gateway 2000 PII 350mhz
Anticipated replacement quantity for 2002					9
Anticipated replacement quantity for 2003					0
Anticipated replacement quantity for 2004	4				0
Operating system	NT Workstation				NT4.0
Quantity	69 Armada 1750				9
Type	Laptop P400				Acer PII 350mhz
Anticipated replacement quantity for 2002					0
Anticipated replacement quantity for 2003					9
Anticipated replacement quantity for 2004	69				0
Operating system	W2000				W98
Quantity					49
Type					Gateway 2000 PIII 566mhz
Anticipated replacement quantity for 2002					0
Anticipated replacement quantity for 2003					0
Anticipated replacement quantity for 2004					49
Operating system					W98
Quantity					82
Type					Cascade PIII 600mhz
Anticipated replacement quantity for 2002					0
Anticipated replacement quantity for 2003					0
Anticipated replacement quantity for 2004					82
Operating system					NT4.0

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
Quantity					60
Type					Acer PIII 800mhz
Anticipated replacement quantity for 2002					0
Anticipated replacement quantity for 2003					0
Anticipated replacement quantity for 2004					0
Operating system					NT4.0
Detail					
1. For each of the workstations, provide the information requested on the attached word document.					
G. Electronics					
Summary					
1. What LAN network topologies are in use for servers and desktops?	Desktops				
10Mb Shared Ethernet				Desktops	Desktops
100Mb Shared Ethernet	Servers			Desktops	Servers
100Mb Switched Ethernet			Desktops	Servers and desktops	Servers
1000Mb Switched Ethernet				Servers	
ATM					Servers
FDDI					
4Mb Token Ring					
16Mb Token Ring					
3270 Legacy Systems					
2. What WAN topologies are in use?					
Frame Relay	Yes			Yes	No
Point to Point (HDLC or PPP)				No	No
ATM				Yes	No
FDDI				No	No
VPN	Yes			Yes	Yes

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
H. Wireless					
Summary					
1. Are any wireless LANs being used or in process of deployment?	No		No	Yes	No
2. Are any mobile data terminals being used or in process of deployment?	No		No	Yes	No
3. Are any mobile data faxes being used or in process of deployment?	No		No	No	No
4. Are radio systems in place?	No		No	Yes	No
Are radio systems shared between departments or standalone?				shared	
What was/is the business case for radio systems deployment for each department/division?				field operations and emergency response	
5. List any proposed/upcoming wireless applications.					
6. Is there an individual responsible for wireless applications?	No		Yes	No	No
If yes, describe that individual's duties and responsibilities.			Network Manager		
Detail					
Detail to be submitted via the attached word document for wireless applications, data terminals, fax devices, and radio systems.					

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
I. Physical Layout					
<u>Summary</u>					
1. What is the square footage allocated to your agency's network closet?	144		40	varies by site	Not enough space to answer this question
2. Does the physical layout include:					
Dedicated lights	Yes		No	Yes	No
Dedicated HVAC	Yes		Yes	Yes	No
UPS Power	Yes		Yes	Yes	Yes
If yes, what duration for 75%	5 minutes		30 minutes	4-6 hours	30 minutes
Dedicated Ground	No		No	Yes	No
If dedicated, is it #6 AWG or greater?				Yes	
Seismic bracking			Yes	Yes	No
Physical security	Yes		Yes	Yes	Yes
Dedicated closet			Yes	Yes	No
II. Operating Systems					
<u>Summary</u>					
1. Indicate which operating systems are in use within your agency, and the number of computers utilizing each operating system.					
Windows 95					
Number of servers					0 W95 is not a server OS
Number of workstations				250	0
Windows 98					
Number of servers					0 W98 is not a server OS
Number of workstations				1060	70
Windows NT					
Number of servers	8			59	8
Number of workstations	116			185	230
Windows ME					
Number of servers					0 WME is not a server OS
Number of workstations					0
Windows 2000					
Number of servers	1		4	14	0
Number of workstations	158		180	140	0

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
Windows XP					
Number of servers					0
Number of workstations					0
Macintosh version 8.0 or newer					
Number of servers				8	0
Number of workstations				130	0
Macintosh older than version 8.0					
Number of servers					0
Number of workstations					0
If others, please specify.				Unix = 2 servers VAX = sewage treatment plant process controls	
III. Software/Applications					
<u>Summary</u>					
1. Which report writers does your agency utilize?					
Crystal	No		Yes	Yes	Yes
Access	No		No	Yes	Yes
Excel	Yes		No	Yes	Yes
FRx	no		No	No	No
Other	VSView		No	No	No
If other, please specify.	3rd party OCX			business objects	
<u>Detail</u>					
1. For each major application in use, provide the information requested on the attached word document.					
2. What major systems and data are interfaced? (Attached word document)					
IV. Backup Processes					
<u>Summary</u>					
1. Are backups for all systems conducted regularly?	No		Yes	No	Yes
If no, which systems are not backed up regularly and why?	Desktop systems are not backed up regularly due to lack of disk space on servers to use home directories and lack of tape drive capacity.			Desktop PC's and Notebooks not backed up.	

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	**Hoang Nguyen**	**Cathy Grindle**	**Paul Gaskill**	**Gary Hocking**	**David Baker**
2. Have there been backup failures?	Yes		Yes	No	Yes
Describe.					Bad tape, time window to small for amount of data needed to be backed up.
3. How long are backups retained?	5 weeks		1 year	3-6 months, depending upon the site	It depends on the system 6 months to forever
Describe any key issues/challenges related to existing backup processes.	Lack of sufficient capacity to effectively perform full backups. Lack of sufficient server disk space to home directories for users, NT 05 does not support disk quotas.				
Detail					
1. Backup software:	ArcServe		Veritas Backup Exec	Veritas, legato, retrospect	Backup Exec
2. Backup hardware:	40 GB DLT and 94) 12 GB DAT Drives		DLT changer	NT Servers	DLT Tape drives, HP Optical Jukebox
3. Schedule for full backups:	M-F		Weekly	weekly	Depends on system, Daily to weekly
4. Schedule for incremental backups:	daily		Weekend. Daily differential	daily	Depends on system, non to daily
5. Backup media:	tape			LTO, DLT, DAT	DLT tape & Optical CD
6. Is off-site media storage used?	Yes		Yes	Yes	Yes
7. Who manages off-site data storage?	We do		Datasite NW	department staff (media sent to remote sites)	King County ITS
V. Internet					
Summary					
1. How many staff have Internet access?	All		All	all with PC access	All of them
2. Describe any key issues/challenges/problems related to existing Internet capabilities.					Enforcing/policing the policy that's in place. Cost and time involved in enforcing & policing to great.

Agency Name	Department of Assessments	KC District Court	KC Council	Department of Natural Resources and Parks	Department of Judicial Administration
Contact Person	Hoang Nguyen	Cathy Grindle	Paul Gaskill	Gary Hocking	David Baker
VI. Staffing					
A. Skills					
Summary					
1. How many staff support IT in your agency?	11		2	30	6
List staff titles.	Division Manger, Programmer/Analyst, System Analyst, Network Admin, DBA		Network Manager LAN administrator	Information Systems Manager Information Systems Professional 2,3,4,5 Information Systems Analyst 2,3 Co	LAN Administrator, Data Dissemination Manager/Programmer, System and Data Base Administrator, Manager, ECR Tech Coordinator, e-filing Project Manager
Detail					
For each of the staff titles with technology responsibilities, indicate what percent of their time is spent on each of the functions identified.					
VII. Telephony - (DIAS Only)					

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
TECHNOLOGY INVENTORY					
I. Network Infrastructure					
A. Network Overview					
Summary					
1. Indicate which network type(s) are in place at your agency					
Client server	Yes	Yes	Yes	Yes	Yes
Peer to peer	No	No	Yes	No	No
Other	No	No	No	No	No
If other, please specify.					
2. What network protocols are in place?	TCP/IP Macintosh	IP, IPX	IP	IP, IPX, TCP/IP	IPX/SPX, TCP/IP, SNA (ENCAPSULATED IN IP), DLC
3. What network topologies are used?					
Ethernet	Yes	Yes	Yes	Yes	
Token ring	No	No	No	No	
Other	No	No	No	No	
If other, please specify.					

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
4. What network operating systems does your agency use?	NT 4.0	NT4, Novell 4.11	Windows NT 4.0	NOVELL NETWARE 5.0, Windows NT	NETWARE, WINDOWS NT, WINDOWS 2000 SERVER
B. Cabling					
1. Does your agency use a mix of cable types?	Yes	Yes	Yes	No	Yes
2. Is a cable upgrade needed?	No	Yes	No	No	No
Describe.		All Cat3 in Courthouse and 10th floor of Bank of Cal. Bldg needs to be upgraded to Cat5		Completion of WAN fiber to one base location still outstanding.	
Detail	15				
1. Indicate what percent of the cabling used to support your network falls into each of the following categories.					
CAT 4	85		98		
CAT 5 or 5e				95%	
CAT 6			2		
Fiber optic				5%	
2. Are any systems certified?	No	No			No
If yes, provide the name and manufacturer for each system that is certified.					
System Certified				Cat5	
Manufacturer				AVYA	
System Certified				Fiber Optic	
Manufacturer				ATT	
C. Servers					
Summary					
1. Indicate the total number of servers used by your agency in each of the following categories.					
Web	2	1	1		2
Communications			1		1
Production	2	7	0		52
Text			0		?
Reporting			0		2
Print	3		7		36
Development	1		1		4
Data	4		12		56

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
Backup	4		5		2
Application	1		5		17
Other			4		0
If other, please describe.			CD-ROM server	Servers categorized as follows: Production (database and applications - but not including web servers): 31 Test/Development (database and applications but not in Web servers: 5	
2. List the type and location of servers below.					
Type		Novell 4.11 - FAM	Data	Unix	SEE DETAIL REPORT
Location		9th floor Bank of Cal	King Street Center (KSC)	Key Tower, KSC, Exchange blg	
Type		NT4 - PAOBOC	Data	NT	
Location		10th floor Bank of Cal	Renton Roads	See Attachment 1	
Type		NT4 - PAOCRM	Print	Linux	
Location		5th floor Courthouse	KSC	KSC, Key Tower, Exchange blg	
Type		NT4 - PAOJUV	Print	Netware	
Location		5th floor Courthouse	Renton Roads	See Attachment 1	
Type		NT4 - PAODogbert	Web		
Location		5th floor Courthouse	KSC		
Type		NT4 - PAOCVL2	Backup		
Location		9th floor Admin Bldg.	KSC		
Type		NT4 - PAOWEB	Backup		
Location		9th floor Admin Bldg.	Renton Roads		
Type		NT4 - PAORJC	CDROM		
Location		2nd floor RJC	KSC		
3. Is your current capacity adequate?		Yes	No	Yes	Yes
If no, describe.			Need more disk space. Need faster processing capability.		
4. Of the total servers listed, how many require upgrading?	4	0	6		6
5. How many updates are planned in each of the following years?					
2002	1		4		
2003			4		
2004			4		

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
6. How many replacements are planned in each of the following years?					
2002	2	3	2	1	6
2003	1	3	2	5	18
2004	1	2	2	8	18
Detail					
1. List each server being used and provide information associated with it on the attached work document.					
D. Network Hardware					
Summary					
1. Describe any key issues/challenges/ problems with existing hubs, routers, switches, etc.		Many hubs are only 10MB. It would be nice to upgrade to 10/100 switches.			Budget required to maintain uptime/production environment.
Detail					
1. List each piece of hardware in place at your agency and provide information associated with it as listed.					
E. Peripheral Devices					
Summary					
1. Total number of printers in place:	24	60	47		350
Locations:	King County Airport Yesler Bldg Administration Bldg Smith Tower	Courthouse Bank of California Bldg. Admin. bldg. Key Tower Youth Services RJC 6 District Courts Kent - Gowe St.	(Networked printers only) KSC, Renton Roads	We have 200 network printers distributed across all Transit facilities	Spread throughout all PH locations.
2. Total number of scanners in place:	2	6	9		30+
Locations:	Yesler Bldg Smith Tower	This is a guess - We do not use scanners for production and they tend to multiply without official sanction.	KSC, Renton Roads	Unknown - not in asset plan	Various, mainly at downtown core sites.
3. Total number of fax machines in place:	8	20	18		71
Locations:	Smith Tower Administration Bldg Yesler Bldg KC Airport	This is a total guess	KSC, Renton Roads, 9 Roads Maintenance remote sites (Vashon, Skykomish, Cadman, Bog, Issaquah, Fall City, Star Lake,	Part of TAMP	Minimum of one per location

Agency Name	KC Executive **OHRM and OCR**	Office of **Prosecuting Attorney**	DOT **Road Services Division**	DOT **Metro Transit Division**	Department of **Public Health**
Contact Person	**Samuel Cardenas**	**Fred Flickinger**	**Marcia Kamin**	**Peggy Willis, Manager, MITT**	**Patty Schwendeman**
			Maple Valley, Summit)		
4. Total number of modems in place:	0	2			30+
Locations:		1 Admin bldg - off WAN 1 BOC	KSC, Renton Roads, in traffic signals	Minimal - PCs use network cards	Various locations, plus all laptops
Detail					
1. List each peripheral device in place at your agency and provide information associated with it as listed on the attached word document.					
F. Workstations					
Summary					
1. Number of workstations in place within your agency:		550	600	1000	1550
2. For each type of the workstations utilized, please provide the following quantity, type, number per year that are anticipated to be replaced, and the operating systems.					
Quantity	Gateway	60	155	1000	
Type	E3000	<P200		Primarily Gateways	PC
Anticipated replacement quantity for 2002	20	60 - depends on funding	140	273	25%
Anticipated replacement quantity for 2003	10			411	25%
Anticipated replacement quantity for 2004	10			183	25%
Operating system	W2K	Win9X	Windows 95	Windows 9x/NT/2000	MS Windows
Quantity	Clone	110	320		
Type	Pentium Class	P200 - <P300			
Anticipated replacement quantity for 2002	18	0-110 - depends of funding			
Anticipated replacement quantity for 2003	0				
Anticipated replacement quantity for 2004	0				
Operating system	W2K	Win9X	Windows 98		

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
Quantity	Macintosh	160	20		
Type	G3	P300-<P500			
Anticipated replacement quantity for 2002	25	0			
Anticipated replacement quantity for 2003		160			
Anticipated replacement quantity for 2004					
Operating system	W2K	Win9X	Windows NT 4.0		
Quantity		220	50		
Type		P500-P850			
Anticipated replacement quantity for 2002		0			
Anticipated replacement quantity for 2003		0			
Anticipated replacement quantity for 2004		220			
Operating system		Win9X	Windows 2000 Pro		
Detail					
1. For each of the workstations, provide the information requested on the attached word document.					
G. Electronics					
Summary					
1. What LAN network topologies are in use for servers and desktops?					
10Mb Shared Ethernet	Desktops	Desktops	Desktops	Desktops	Desktops
100Mb Shared Ethernet	Desktops	Desktops	Desktops		Desktops
100Mb Switched Ethernet	Servers	Desktops	Desktops	Servers	Desktops
1000Mb Switched Ethernet				Servers	
ATM					
FDDI					
4Mb Token Ring					
16Mb Token Ring					
3270 Legacy Systems					Desktops

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
2. What WAN topologies are in use?					
Frame Relay	No	Yes	Yes		Yes
Point to Point (HDLC or PPP)	No	No	No		Yes
ATM	No	Yes	Yes		Yes
FDDI	No	No	No		Yes
VPN	Yes	No	Yes		Yes
H. Wireless					
Summary					
1. Are any wireless LANs being used or in process of deployment?	No	No	No	Yes	No
2. Are any mobile data terminals being used or in process of deployment?	No	No	Yes	Yes	No
3. Are any mobile data faxes being used or in process of deployment?	No	No	No	No	No
4. Are radio systems in place?	No	No	Yes	Yes	Yes
Are radio systems shared between departments or standalone?			Shared	See Attachment 1	
What was/is the business case for radio systems deployment for each department/division?			Communications for field staff for emergency communications	Communications with bus operators and Metro Transit supervisory, maintenance and support staff is essential to providing safe, secure and reliable transit service.	PH Emergency Operations Center
5. List any proposed/upcoming wireless applications.				Replacement of the existing transit radio and automatic vehicle location (AVL) system. Implementation of a wireless local area network (WLAN) at seven transit operating bases to download a variety of data from the bus fleet. Implementation of mobile data terminals and automatic vehicle location for approx. 300 paratransit vans operated by contracted service providers. Implementation of mobile computing for approx. 25	

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
				field supervisor vans.	
6. Is there an individual responsible for wireless applications?	No	No	No	Yes	Yes
If yes, describe that individual's duties and responsibilities.				There are several individuals in Transit responsible for various aspects of wireless communications. Dan Overgaard - Supervisor of Systems Management & Analysis, oversight for project management Hai Phung - Project Manager for Radio/AVL System. Walt Miller - Technical lead for Radio Maintenance group. Janey Elliott - Project Manager for the paratransit MDT project.	MIS is responsible for all aspects of hardware research and development, purchase, policy/procedure and implementation.
Detail					
Detail to be submitted via the attached word document for wireless applications, data terminals, fax devices, and radio systems.					
I. Physical Layout					
Summary					
1. What is the square footage allocated to your agency's network closet?	Wiring close in 4 different bldgs - vary 30-150 sf	unknown			Varies by site - 22 sites
2. Does the physical layout include:					
Dedicated lights	Yes	No	Yes	Yes	No
Dedicated HVAC	No	No	Yes	Yes	Yes
UPS Power	No	No	Yes	Yes	Yes
If yes, what duration for 75%					10 min
Dedicated Ground	No	Yes	Yes	Yes	No
If dedicated, is it #6 AWG or greater?	No			Yes	
Seismic bracking	Yes	Yes	Yes	No	Yes
Physical security	No	Yes	Yes	Yes	Yes
Dedicated closet	No	Yes	Yes	Yes	No

Agency Name	KC Executive **OHRM and OCR**	Office of **Prosecuting Attorney**	DOT **Road Services Division**	DOT **Metro Transit Division**	Department of **Public Health**
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
II. Operating Systems					
<u>Summary</u>					
1. Indicate which operating systems are in use within your agency, and the number of computers utilizing each operating system.					
Windows 95					
Number of servers			0		0
Number of workstations		250	155		45
Windows 98					
Number of servers			3		0
Number of workstations		300	320		1469
Windows NT					
Number of servers	9	7	20		17
Number of workstations			18		6
Windows ME					
Number of servers			0		0
Number of workstations			0		0
Windows 2000					
Number of servers	6		0		1
Number of workstations			50		30
Windows XP					
Number of servers			0		0
Number of workstations			0		0
Macintosh version 8.0 or newer					
Number of servers			0		0
Number of workstations			0		0
Macintosh older than version 8.0					
Number of servers			0		0
Number of workstations			0		0
If others, please specify.		1 Novell server		Workstations are predominantly Win98, NT. Some older machines have Win95. New machines come in with Win 2000. Intention is to standardize on single operating system within 1-2 years - but requires budget approvals.	Netware Servers - 30, SCO Unix - 1, Linux - 1, O/S2 - 1

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
III. Software/Applications					
Summary					
1. Which report writers does your agency utilize?					
Crystal	Yes	No	Yes	Yes	Yes
Access	Yes	Yes	No	Yes	Yes
Excel	Yes	Yes	No	No	Yes
FRx	No	No	No	No	Yes
Other	No	No	No	No	Yes
If other, please specify.				Delphi Quick Reports, Powerbuilder, Oracle Dev 2000, and other vendor supplied tools as part of software packages	SAS, SPSS, dBase, OAS
Detail					
1. For each major application in use, provide the information requested on the attached word document.					
2. What major systems and data are interfaced? (Attached word document)					
IV. Backup Processes					
Summary					
1. Are backups for all systems conducted regularly?	Yes	Yes	Yes	Yes	Yes
If no, which systems are not backed up regularly and why?					

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
2. Have there been backup failures?	No	Yes	Yes	Yes	Yes
Describe.		Ask ITS about Tivoli	Restore process did not work.	ITS managed backups of Unix servers has been inconsistent. ITS is in the process of replacing TSM with Legato. One application has had backup failures attributable a combination of the backup software and the vendor application. New procedures are being put in place. Other NT backups have been very consistent. On rare occasions there is a failure due to human error when tapes are not staged. New tape backup hardware has been purchased to migrate towards more centralized and automated processes.	Backing up 56 servers on a daily basis across WAN links will occasionally fail due to issues outside PH's control
3. How long are backups retained?	2 years	Ask ITS	3-6 months	Up to 10 years depending on type of data	3 months
Describe any key issues/challenges related to existing backup processes.			Need offsite storage. Developing a plan to study and implement offsite storage options.		Ongoing costs to support off-site storage and backup
Detail					
1. Backup software:	Backup Exec	Tivoli for all but Family Support	Backup Exec	TSM, Legato	Legato
2. Backup hardware:	Compaq	Ask ITS	Adic FastStor, 2 x DLT1, Storage Dimensions P1000	See Attachment 1	W2K:Dell PowerEdge 2500 w Dell PowerVault 130
3. Schedule for full backups:	weekly full/monthly/yearly		once per week	See Attachment 1	one full per month
4. Schedule for incremental backups:	Daily	5 nights	nightly	Daily	daily
5. Backup media:	various tape media - DLT	ask ITS	DLT tapes	Tape	dlt7000
6. Is off-site media storage used?	Yes	Yes	No	Yes	No
7. Who manages off-site data storage?		ITS		DataSite, not sure for ITS tapes	
V. Internet					
Summary					
1. How many staff have Internet access?	All	All	all	Virtually all staff with PCs	All
2. Describe any key issues/challenges/problems			speed at some locations	Currently developing policies and mechanisms for appropriate use.	Management complaints regarding employee's Internet usage

Agency Name	KC Executive OHRM and OCR	Office of Prosecuting Attorney	DOT Road Services Division	DOT Metro Transit Division	Department of Public Health
Contact Person	Samuel Cardenas	Fred Flickinger	Marcia Kamin	Peggy Willis, Manager, MITT	Patty Schwendeman
related to existing Internet capabilities.					
VI. Staffing					
A. Skills					
Summary					
1. How many staff support IT in your agency?	6	10	9	51	26
List staff titles.	Information Systems Coordinator LAN Administrator Programmer Analyst	Director of IT Director of Computer Services Web developer Deputy Prosecutor - Family support Web Deve	LAN administrator, PC Coordinator II, Computer Technology Specialist, ISA	ISA I, II, III, IV Other staff in Transit may also work sometimes with Technical systems as part of their responsibilities	ISP I, II, III, IV, ISA IV, ISA III
Detail					
For each of the staff titles with technology responsibilities, indicate what percent of their time is spent on each of the functions identified.					

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	Brian Bothomley	Jose Deleon	Teri Bednarski	Jeff Straughn - Sr. LAN Administrator	Kevin Daggett
TECHNOLOGY INVENTORY					
I. Network Infrastructure					
A. Network Overview					
Summary					
1. Indicate which network type(s) are in place at your agency					
Client server	Yes	Yes	Yes	Yes	Yes
Peer to peer	Yes	No	Yes	Yes	Yes
Other	No	No	No	No	
If other, please specify.					
2. What network protocols are in place?	IP IPX	TCP/IP	IPX, IP, encapsulated Netbios	IPX (Ethernet 802.2) IP (Ethernet_II)	IPX, IP, encapsulated Netbios
3. What network topologies are used?					
Ethernet	Yes	Yes	Yes	Yes	Yes
Token ring	No	No	Yes	No	No
Other	No	No	No	No	No
If other, please specify.					

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	Brian Bothomley	Jose Deleon	Teri Bednarski	Jeff Straughn - Sr. LAN Administrator	Kevin Daggett
4. What network operating systems does your agency use?	NT 4.0 Netware 3.11 VMS UNIX	MICROSOFT NT 4.0 MICROSOFT WINDOWS 2000	Netware 5.1, Windows NT4 Server, Windows 2000 desktop, Windows 98 on laptop	Netware 5.1 Windows NT 4.0 Sp5	Desktop: NT4, Windows 2000, Windows XP, Window 98 Severs: Windows NT4, Windows 2000, Novell 5.0
B. Cabling					
1. Does your agency use a mix of cable types?	No	Yes	Yes	Yes	Yes
2. Is a cable upgrade needed?	No	Yes	No	Yes	Yes
Describe.		Possible upgrade required at motor pool garage and at Building F, G, J of Renton consolidated maintenance facility in order to increase bandwidth for users	All cabling is CAT5 except from the router to the WAN there is the option of Fiber (yet to be completed)	Some cabling at King County Correctional Facility and Youth Services Center does not pass Cat5 Certification. All of the cabling at the Regional Justice Center is 10Mbit	Some Cat3 needs to be updated. The rest is Cat5 or higher
Detail				0	
1. Indicate what percent of the cabling used to support your network falls into each of the following categories.					
CAT 4	100			50	15
CAT 5 or 5e			99	0	85
CAT 6			1	0	
Fiber optic				50	
2. Are any systems certified?	Yes			Yes	
If yes, provide the name and manufacturer for each system that is certified.	Check with the NOC			Dell File Servers	No
System Certified				Dell Computers	
Manufacturer					
C. Servers					
Summary					
1. Indicate the total number of servers used by your agency in each of the following categories.					
Web	7	1	0	3	4
Communications		1	0	0	
Production	2		0	6	15
Text			0	0	
Reporting			0	1	

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	Brian Bothomley	Jose Deleon	Teri Bednarski	Jeff Straughn - Sr. LAN Administrator	Kevin Daggett
Print	2		0	??	
Development	2	1	0	0	4
Data	6		0	2	
Backup	1		0	1	2
Application	2	2	1	2	
Other			1		
If other, please describe.			Data Security		
2. List the type and location of servers below.					
Type	NT 4.0 (10 total)	NT 4.0 (ALL SERVERS)	Netware 5.1	Netware 4.11	NT4
Location	7th fl Exch. Server room	KING STREET CENTER - 8TH F	Watthew Bldg	KCCF Server Room	KCCH (4), Juvy Hall (5), Re Justice (2)
Type	NT 4.0 (6 total)		Windows NT 4	Netware 4.11	Windows 2000
Location	7th fl main floor area		Walthew Bldg	KCCF Server Room	Juvenile Hall (1) KCCH (3)
Type	NT 4.0 (1 total			Netware 4.11	Novell 5
Location	6th fl Admin. Bldg.			KCCF Server Room	Juvenile Hall (2)
Type	Netware 3.11 (2 total)			Windows NT	
Location	7th fl Exch. Server room			KCCF Server Room	
Type	VMS			Windows NT	
Location	Key tower Computer Rm.			Key Tower	
Type	UNIX			Netware 4.11	
Location	Key tower Computer Rm.			Regional Justice Center	
Type				Netware 5.1	
Location				Regional Justice Center	
Type				Netware 5.1	
Location				Regional Justice Center	
3. Is your current capacity adequate?	No	Yes	No	Yes	Yes
If no, describe.	We have just purchased 3 new servers. As soon as they are in place we should be ok for a couple of years.		File server running at 200 Mhz with 20 G HD		
4. Of the total servers listed, how many require upgrading?	7	1	2	2	6
5. How many updates are planned in each of the following years?					
2002	0		0	0	
2003	0		0	0	

| Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	Brian Bothomley	Jose Deleon	Teri Bednarski	Jeff Straughn - Sr. LAN Administrator	Kevin Daggett
2004	0		0	0	5
6. How many replacements are planned in each of the following years?					
2002	0	1	0	0	0
2003	0		0	0	0
2004	0		0	0	0
<u>Detail</u>					
1. List each server being used and provide information associated with it on the attached work document.					
D. Network Hardware					
<u>Summary</u>					
1. Describe any key issues/challenges/problems with existing hubs, routers, switches, etc.	None	POSSIBLE UPGRADE REQUIRED AT MOTOR POOL GARAGE AND AT BUILDING F, G, J OF RENTON CONSOLIDATED MAINTENANCE FACILITY IN ORDER TO INCREASE BANDWIDTH FOR USERS.		There is still a fair amount of Shared Media Hubs at KCCF, Regional Justice Center Switches originally purchased are 10Mbit which are quickly becoming a problem.	We are in good shape here.
<u>Detail</u>					
1. List each piece of hardware in place at your agency and provide information associated with it as listed.					
E. Peripheral Devices					
<u>Summary</u>					
1. Total number of printers in place:	44	21	12	68	105
Locations:	7th, 8th, 3rd floors Exchange Bldg. 107 subnet 6th floor Admin	KING STREET CENTER - 6 MOTOR POOL - 3 RENTON - 9 TRANSIT NRV - 3	Downtown, DYS, RJC,	Youth Services, King County Correctional Facility, King County Court House, Regional Justice Center	Youth Services, King County Court House, Regional Justice Center
2. Total number of scanners in place:	10	1	3	6	3
Locations:	7th, 8th, 3rd floors Exchange Bldg. 107 subnet 6th floor Admin	KING STREET CENTER - 1	Downtown	King County Correctional Facility, Regional Justice Center	Youth Services, King County Court House
3. Total number of fax machines in place:	15	6	3		5
Locations:	7th, 8th, 3rd floors Exchange Bldg.	KING STREET CENTER - 1	Downtown, DYS, RJC,	NOT TRACKED BY	Downtown, DYS, RJC,

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	**Brian Bothomley**	**Jose Deleon**	**Teri Bednarski**	**Jeff Straughn - Sr. LAN Administrator**	**Kevin Daggett**
	107 subnet 6th floor Admin	MOTOR POOL - 2 RENTON - 2 TRANSIT NRV - 1		INFORMATION SERVICES SECTION	
4. Total number of modems in place:	3	10	0	0	0
Locations:	7th, 8th, 3rd floors Exchange Bldg. 107 subnet 6th floor Admin	KING STREET CENTER - 5 MOTOR POOL - 1 RENTON - 3 TRANSIT NRV - 1			
Detail					
1. List each peripheral device in place at your agency and provide information associated with it as listed on the attached word document.					
F. Workstations					
Summary					
1. Number of workstations in place within your agency:		56	30	366	550
2. For each type of the workstations utilized, please provide the following quantity, type, number per year that are anticipated to be replaced, and the operating systems.					
Quantity	282	18	30	Pentium	
Type	Pentium II	DESKTOP	605 Mhz Master Computers	196	
Anticipated replacement quantity for 2002	0	7	0	Subject to budget approval	15%
Anticipated replacement quantity for 2003	0	1	0	Subject to budget approval	25%
Anticipated replacement quantity for 2004	0	10	0	Subject to budget approval	60%
Operating system	0	NT 4.0	Windows 2000	Windows	Windows XP
Quantity	15	34		Pentium ii	
Type	Pentium III	DESKTOP		40	
Anticipated replacement quantity for 2002	0			Subject to budget approval	
Anticipated replacement quantity for 2003	0			Subject to budget approval	
Anticipated replacement quantity for 2004	0			Subject to budget approval	

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	**Brian Bothomley**	**Jose Deleon**	**Teri Bednarski**	**Jeff Straughn - Sr. LAN Administrator**	**Kevin Daggett**
Operating system	0	WINDOWS 2000			
Quantity		1		Pentium 3	
Type		DESKTOP		130	
Anticipated replacement quantity for 2002		1		Subject to budget approval	
Anticipated replacement quantity for 2003				Subject to budget approval	
Anticipated replacement quantity for 2004				Subject to budget approval	
Operating system		WINDOWS 95			
Quantity		2			
Type		LAPTOP			
Anticipated replacement quantity for 2002		2			
Anticipated replacement quantity for 2003					
Anticipated replacement quantity for 2004					
Operating system		NT 4.0			
Quantity		1			
Type		LAPTOP			
Anticipated replacement quantity for 2002		1			
Anticipated replacement quantity for 2003					
Anticipated replacement quantity for 2004					
Operating system		WINDOWS 95			
Detail					
1. For each of the workstations, provide the information requested on the attached word document.					
G. Electronics					
Summary					
1. What LAN network topologies are un use for servers and desktops?					
10Mb Shared Ethernet	Desktops	Desktops		Desktops	
100Mb Shared Ethernet	Desktops	Desktops	Servers		

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	Brian Bothomley	Jose Deleon	Teri Bednarski	Jeff Straughn - Sr. LAN Administrator	Kevin Daggett
100Mb Switched Ethernet		Servers		Servers	Servers/Desktops
1000Mb Switched Ethernet					
ATM					
FDDI	Servers				
4Mb Token Ring					
16Mb Token Ring			Desktops		
3270 Legacy Systems			Desktops	Desktops	
2. What WAN topologies are in use?					
Frame Relay	No	Yes	No	No	
Point to Point (HDLC or PPP)	No	Yes	No	No	
ATM	Yes	No	Yes	Yes	Yes
FDDI	Yes	No	No	Yes	Yes
VPN	No	Yes	No	No	Yes
H. Wireless					
Summary					
1. Are any wireless LANs being used or in process of deployment?	No	No	No	Yes	No.
2. Are any mobile data terminals being used or in process of deployment?	No	No	No	No	
3. Are any mobile data faxes being used or in process of deployment?	No	No	No	No	No
4. Are radio systems in place?	No	Yes	No	Yes	No
Are radio systems shared between departments or standalone?		Between departments		Shared	
What was/is the business case for radio systems deployment for each department/division?		Dispatch emergency response		Life Safety, Critical information sharing	
5. List any proposed/upcoming wireless applications.		Exploring wireless capabilities for field technicians to do data entry into our fleet management application			

| Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	**Brian Bothomley**	**Jose Deleon**	**Teri Bednarski**	**Jeff Straughn - Sr. LAN Administrator**	**Kevin Daggett**
6. Is there an individual responsible for wireless applications?		Yes	No	Yes	
If yes, describe that individual's duties and responsibilities.		ISA3		Keeping wireless functioning. All responsibilities.	
Detail					
Detail to be submitted via the attached word document for wireless applications, data terminals, fax devices, and radio systems.					
I. Physical Layout					
Summary					
1. What is the square footage allocated to your agency's network closet?			35 square feet	3 closets 240 Sqft+/each	200 Sqft average for all.
2. Does the physical layout include:					
Dedicated lights	No	Yes	No	Yes	No
Dedicated HVAC	Yes		Yes	Yes	No
UPS Power	Yes		Yes	Yes	No
If yes, what duration for 75%	20min			20 minutes	
Dedicated Ground	Yes		Yes	Yes	Yes
If dedicated, is it #6 AWG or greater?	Yes				
Seismic bracking	No		Yes	No	No
Physical security	Yes		Yes	Yes	Yes
Dedicated closet	Yes		No	No	No

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	**Brian Bothomley**	**Jose Deleon**	**Teri Bednarski**	**Jeff Straughn - Sr. LAN Administrator**	**Kevin Daggett**
II. Operating Systems					
Summary					
1. Indicate which operating systems are in use within your agency, and the number of computers utilizing each operating system.					
Windows 95					0
Number of servers	None	0		0	0
Number of workstations	179	2		213	550
Windows 98					
Number of servers	None	0		0	0
Number of workstations	20	0	1	150	525
Windows NT					0
Number of servers	18	5	1	2	9
Number of workstations	75	20		1	0
Windows ME					0
Number of servers	None	0		0	0
Number of workstations	None	0		0	0
Windows 2000					0
Number of servers	None	0		0	4
Number of workstations	28	34	30	1	20
Windows XP					0
Number of servers	None	0		0	0
Number of workstations	None	0		0	5
Macintosh version 8.0 or newer					
Number of servers	None	0		0	0
Number of workstations	None	0		0	0
Macintosh older than version 8.0					0
Number of servers	None	0		0	0
Number of workstations	None	0		0	0
If others, please specify.	Soon all will be Win 2000		Netware 5.1	Mandrake Linux	Netware 5.0

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	Brian Bothomley	Jose Deleon	Teri Bednarski	Jeff Straughn - Sr. LAN Administrator	Kevin Daggett
III. Software/Applications					
Summary					
1. Which report writers does your agency utilize?					
Crystal	Yes	Yes	No	Yes	Yes
Access	Yes	No	No	Yes	Yes
Excel	Yes	Yes	No	Yes	Yes
FRx	No	No	No	No	
Other	No	No	Yes	No	
If other, please specify.			PC FOCUS		PowerBuilder
Detail					
1. For each major application in use, provide the information requested on the attached word document.					
2. What major systems and data are interfaced? (Attached word document)					
IV. Backup Processes					
Summary					
1. Are backups for all systems conducted regularly?	No	Yes	No	Yes	Yes
If no, which systems are not backed up regularly and why?	Just the servers, no workstations.		Yes, until backup tape failure, waiting for ordered replacement		
2. Have there been backup failures?	Yes	No	Yes	Yes	Yes
Describe.	Bad tapes, bad autoloader, software errors.			Intermittent Software or Hardware failures. Easily fixed.	Some hardware and software issues.
3. How long are backups retained?	4 weeks and once a year a full archive	2 MONTHS	One year	Min of 1 quarter	One month
Describe any key issues/challenges related to existing backup processes.	So far none.	None	Software/hardware incompatible		
Detail					
1. Backup software:	Backup Exec V7.6	NT 4.0	Backup Exec/Veritas	BackupExec	BackupExec
2. Backup hardware:	Compaq Plroliant with 2 4mm DAT autoloaders	HP SURESTORE DLT 40	Compaq DLT	ADIC Tape Library HVD SCSI	ADIC Tape Library HVD SCSI, Gateway Server Stacker
3. Schedule for full backups:	Once a week	Daily	Nightly	31 days	Nightly

Agency Name	Finance	DOT Fleet Administration	DCHS Office of Public Defense	Department of Adult and Juvenile Detention	King County Superior Court
Contact Person	**Brian Bothomley**	**Jose Deleon**	**Teri Bednarski**	**Jeff Straughn - Sr. LAN Administrator**	**Kevin Daggett**
4. Schedule for incremental backups:	nightly	NONE		Never-We do Differential	
5. Backup media:	4 mm tape	TAPE	Tape	DLT-IV tapes	DLT=4 Tapes, 4mm tapes
6. Is off-site media storage used?	Yes	No	Yes	No	
7. Who manages off-site data storage?	Sent to ITS	NA	WAN Administrator		Wan/LAN Admins
V. Internet					
<u>Summary</u>					
1. How many staff have Internet access?	All	38	All	172	All
2. Describe any key issues/challenges/problems related to existing Internet capabilities.	Downloading files and wasting time..	NONE		Very Intermittent failures at Routers or Firewall.	
VI. Staffing					
A. Skills					
<u>Summary</u>					
1. How many staff support IT in your agency?		2	1	6	8
List staff titles.	LAN Administrator	ISA3 SYSTEMS ANALYST	Wide Area Network Administrator	Information Systems Manager LAN Administrator PC Coordinator	Information Systems Director, ISP 2,3,4
<u>Detail</u>					
For each of the staff titles with technology responsibilities, indicate what percent of their time is spent on each of the functions identified.					

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
TECHNOLOGY INVENTORY				
I. Network Infrastructure				
A. Network Overview				
<u>Summary</u>				
1. Indicate which network type(s) are in place at your agency				
Client server	Yes	Yes	Yes	Yes
Peer to peer				Yes
Other				
If other, please specify.				
2. What network protocols are in place?	TCP/IP	TCP/IP, IPX/SPX (in-house)	IPX, TCP/IP	TCP/IP, IPX, AppleTalk, SNA
3. What network topologies are used?				
Ethernet	Yes	Yes	Yes	Yes
Token ring				
Other				
If other, please specify.				
4. What network operating systems does your agency use?	Microsoft WIN 95/98/2000 pao WIN NT 4.0	Windows NT 4.0 Server, MS Windows 2000 Server (Member Server)	Unix, Netware, NT, WIN2000	NT
B. Cabling				
1. Does your agency use a mix of cable types?	Yes	Yes	No	No
2. Is a cable upgrade needed?	Yes	No	No	No
Describe.				
<u>Detail</u>				
1. Indicate what percent of the cabling used to support your network falls into each of the following categories.				
CAT 4			100	
CAT 5 or 5e	99.9			100
CAT 6				
Fiber optic	0.1			

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
2. Are any systems certified?	No	No	No	No
If yes, provide the name and manufacturer for each system that is certified.				
System Certified				
Manufacturer				
C. Servers				
Summary				
1. Indicate the total number of servers used by your agency in each of the following categories.				
Web	4		2	30
Communications			0	15
Production	6		5	20
Text	3		0	0
Reporting			In production	0
Print	8	1	1	6
Development	2		2	10
Data	1	1	3	6
Backup	6	1	1	1
Application			In production	8
Other				0
If other, please describe.				
2. List the type and location of servers below.				
Type	I86 (NT 4.0)	Windows NT 4.0 Server	All servers	NT
Location	KCCH/RJC/PCTS 2/3/4/5/ATU	Airport Admin	900 Oaksdale Ave. SW	Courthouse, Admin Building, Key Tower, 7300 Building, Kent Animal Shelter
Type		Windows NT 4.0 Server		Unix
Location		Airport Admin		Key Tower Data Center
Type		Windows 2000 Server		
Location		Airport Admin		
3. Is your current capacity adequate?	No	Yes	Yes	Yes
If no, describe.	Growing needs			
4. Of the total servers listed, how many require upgrading?	8	1	3	5

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
5. How many updates are planned in each of the following years?				
2002	5		3	0
2003				4
2004		1		1
6. How many replacements are planned in each of the following years?				
2002	3			0
2003	2			5
2004				5
Detail				
1. List each server being used and provide information associated with it on the attached work document.				
D. Network Hardware				
Summary				
1. Describe any key issues/challenges/problems with existing hubs, routers, switches, etc.	With purchase and installation of several new switches, network congestion is improving, a site at a time.		Note for Section G below. All servers and clients are on 100B< Switched Ethernet network.	Equipment replacement funding
Detail				
1. List each piece of hardware in place at your agency and provide information associated with it as listed.				
E. Peripheral Devices				
Summary				
1. Total number of printers in place:	40	9		60
Locations:	Court House, RJC, ICTS and Storefronts, Airport, OMU, Metro	Airport Admin, Airport Maintenance, Airport Police	All at 900 Oakesdale Ave. SW	Key Tower, Admin Building, Courthouse, 7300 Building, Kent Animal Shelter, Greybar Building
2. Total number of scanners in place:	40	1	1	20
Locations:	Court House, RJC, ICTS and Storefronts, Airport, OMU, Metro	Airport Admin	All at 900 Oakesdale Ave. SW	Key Tower, Courthouse, Admin Building, 7300 Building

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	**Gary Shumway**	**Joel Abanes**	**Larry Faucher**	**Kevin Kearns**
3. Total number of fax machines in place:	15	1	10	30
Locations:	Court House, RJC, ICTS and Storefronts, Airport, OMU, Metro	Airport Admin	All at 900 Oakesdale Ave. SW	Key Tower, Courthouse, Admin Building, 7300 Building, Kent Animal Shelter, Greybar Building
4. Total number of modems in place:	?		1	10
Locations:			900 Oakesdale Ave. SW, Server Room	Key Tower, Admin Building, Courthouse
<u>Detail</u>				
1. List each peripheral device in place at your agency and provide information associated with it as listed on the attached word document.				
F. Workstations				
<u>Summary</u>				
1. Number of workstations in place within your agency:		48		650
2. For each type of the workstations utilized, please provide the following quantity, type, number per year that are anticipated to be replaced, and the operating systems.				
Quantity	580	2	370	640
Type	Laptops	P133	Generic	Intel Pentium
Anticipated replacement quantity for 2002	223	2	130 (M/B-CPU Upgrade only)	50
Anticipated replacement quantity for 2003	222		185 (CPU only)	60
Anticipated replacement quantity for 2004	215			60
Operating system	98	Win NT 4.0	Win 98	Windows
Quantity	429	1	39 - Laptops	10
Type	Desktops	PII 233		Macintosh
Anticipated replacement quantity for 2002			15	0
Anticipated replacement quantity for 2003		1	0	0
Anticipated replacement quantity for 2004			29	0

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
Operating system	98, NT, 2000	Win NT 4.0		MAC OS
Quantity		2		
Type		PII 333		
Anticipated replacement quantity for 2002				
Anticipated replacement quantity for 2003		2		
Anticipated replacement quantity for 2004				
Operating system		Win NT 4.0		
Detail				
1. For each of the workstations, provide the information requested on the attached word document.				
G. Electronics				
Summary				
1. What LAN network topologies are un use for servers and desktops?				
10Mb Shared Ethernet	Desktops		Desktops	Desktops, Servers
100Mb Shared Ethernet	Desktops	Desktops		Desktops, Servers
100Mb Switched Ethernet	Desktops/Servers			Desktops, Servers
1000Mb Switched Ethernet				Servers
ATM	Servers			
FDDI				Servers
4Mb Token Ring				
16Mb Token Ring				
3270 Legacy Systems				Desktops, Servers
2. What WAN topologies are in use?				
Frame Relay	Yes			Yes
Point to Point (HDLC or PPP)	Yes	Yes		Yes
ATM	Yes			Yes
FDDI				Yes
VPN	Yes	Yes	Yes	Yes

| Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
H. Wireless				
Summary				
1. Are any wireless LANs being used or in process of deployment?	No	No	No	No
2. Are any mobile data terminals being used or in process of deployment?	Yes	Yes	Yes	Yes
3. Are any mobile data faxes being used or in process of deployment?	No	No	No	No
4. Are radio systems in place?	Yes	No	No	Yes
Are radio systems shared between departments or standalone?				King County is part of a Countywide consortium that operates an 800 MHz trunked radio system for all public safety and public service agencies in the county. This system is described in an overview informational package that is included in the set of documentation being compiled for the consultants. The original business case for the radio system was that the large number of non-compatible and aging systems that were in use at the time were complicating service delivery in the field. This was primarily in public safety situations, but other public services were also experiencing difficulties with effective communications in the field. The regional trunked system was developed to meet a variety of business needs including coverage, capacity, compatibility, cost containment, reliability, etc. Numerous agencies are interested in "wireless" for numerous reasons, including (1) getting their mobile workforce connected to in-house data and systems, (2) improving the effectiveness and safety of mobile workers, (3) getting currently office-bound workers more mobile, and (4) allowing constituents wireless access to on-line government services when they are offered. There are no specifically proposed wireless application projects in DIAS right now, but ITS is anxious to work with other agencies to develop strategies for implementing

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
				wireless applications that meet collective needs. There is a strong feeling that the real drive for "wireless" needs to come from the application side of the equation, but there may also be the need to create a "launch point" to get folks thinking more about wireless functionality in their business. ITS is considering initiating an effort to provide wireless-optimized access to the Intranet, the county's E-Mail system, and the Internet, so that agencies can start to use it more in their normal work and start to build their understanding and comfort with "wireless" data.
What was/is the business case for radio systems deployment for each department/division?	Police dispatch, warrant checks			
5. List any proposed/upcoming wireless applications.	Want to used wireless access to check WASIC and NCIC			
6. Is there an individual responsible for wireless applications?	No	No	No	No
If yes, describe that individual's duties and responsibilities.				While no specific person is assigned to this responsibility, we have several of our ITS staff engaged in monitoring the "wireless" world and developing knowledge and understanding to be prepared to work with client agencies as wireless application initiatives develop.
Detail				
Detail to be submitted via the attached word document for wireless applications, data terminals, fax devices, and radio systems.				
I. Physical Layout				
Summary				
1. What is the square footage allocated to your agency's network closet?	56	10 feet x 5 feet	Computer Room 300 sqft; Server Room 150 sqft	1500

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2. Does the physical layout include:				
Dedicated lights	No	No	Yes	Yes
Dedicated HVAC	No	Yes	No	Yes
UPS Power	Yes	Yes	Yes	Yes
If yes, what duration for 75%	10 minutes	25%		30 Minutes
Dedicated Ground	No	Yes	Yes	Yes
If dedicated, is it #6 AWG or greater?	No	No		Yes
Seismic bracking	No	Yes	No	Yes
Physical security	Yes	Yes	Yes	Yes
Dedicated closet	Yes	Yes	Yes	Yes
II. Operating Systems				
Summary				
1. Indicate which operating systems are in use within your agency, and the number of computers utilizing each operating system.				
Windows 95				
Number of servers			0	0
Number of workstations			0	50
Windows 98				
Number of servers			0	0
Number of workstations		3	361, plus 39 laptops	50
Windows NT				
Number of servers	20	2	4	50
Number of workstations		30	1	300
Windows ME				
Number of servers			0	0
Number of workstations			2	0
Windows 2000				
Number of servers		1	1	10
Number of workstations		8	6	200
Windows XP				
Number of servers			0	0
Number of workstations			0	50

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Macintosh version 8.0 or newer				
Number of servers			0	0
Number of workstations			0	8
Macintosh older than version 8.0				
Number of servers			0	0
Number of workstations			0	0
If others, please specify.				
III. Software/Applications				
Summary				
1. Which report writers does your agency utilize?				
Crystal	Yes		Yes	Yes
Access	Yes	Yes	Yes	Yes
Excel		Yes	Yes	Yes
FRx				
Other				
If other, please specify.				
Detail				
1. For each major application in use, provide the information requested on the attached word document.				
2. What major systems and data are interfaced? (Attached word document)				
IV. Backup Processes				
Summary				
1. Are backups for all systems conducted regularly?	Yes	Yes	Yes	Yes
If no, which systems are not backed up regularly and why?				
2. Have there been backup failures?	Yes	No	No	Yes
Describe.				Occasional hardware failures; tape failures, or connectivity failures have prevented backups from running or completing.

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3. How long are backups retained?	3 months			Varies depending upon system being backed up.
Describe any key issues/challenges related to existing backup processes.	Problems/issues resolved			Speed and reliability of tape systems and volume data versus capacity and speed of hardware.
Detail				
1. Backup software:	Backup Executive	Tivoli System Manager and Arcserve	Backup Exec	TSM, Veritas
2. Backup hardware:	DLT	DLT	HP Surestore	IB< Mainframe, various tape systems
3. Schedule for full backups:	Weekly	Friday	Monthly	Varies
4. Schedule for incremental backups:	Daily	Monday-Thursday	Daily	Varies
5. Backup media:	DAT4		DAT	Tape
6. Is off-site media storage used?	Yes	Yes	Yes	Yes
7. Who manages off-site data storage?	Own organization		Eric Manson, LAN Administrator	Outsourced to Blue Mountain
V. Internet				
Summary				
1. How many staff have Internet access?	All (1245)	All employees have internet access	All	All
2. Describe any key issues/challenges/problems related to existing Internet capabilities.	Downloading unsupported software, virus		User abuse - downloading unauthorized files and programs.	See Technology Survey - Internet section
Detail (DIAS Only)				
1. Internet service provided by:				King County
2. Type of Internet access connection:				WAN
3. Speed/Bandwidth:				Will be provided 12/14/01
4. Content maintenance provided by:				King County/ITS
5. Email hosting provided by:				King County/ITS
6. Firewall/Security system brand:				Will be provided 12/14/01
7. Firewall/Security system location:				Will be provided 12/14/01

Agency Name	Sherrif's Office	King County International Airport	Department of Development and Environmental Services	Department of Information and Administrative Services
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8. Who is responsible for Internet security? (Internal/external resource)				ITS
9. What training has the staff responsible for Internet security received in Internet security systems? (Describe)				Will be provided 12/14/01
10. Is DHCP performed?				Yes
If yes, is it centralized or distributed? (Select one)				Centralized
11. Is Internet caching performed?				Yes
If yes, is it centralized or distributed? (Select one)				Centralized
VI. Staffing				
A. Skills				
Summary				
1. How many staff support IT in your agency?	14	45-1	10	See Technology Staffing section of technology survey
List staff titles.	Wan Administrator, Micro Computer Specialist, Help Desk Coordinator, Trainer, Help Desk Technician, IRIS Administrator, Systems Admin.		1 Program Analyst IV, 1 LAN Administrator, 2 Microcomputer Specialist, 5 Computer Technology Specialists	All staff are information systems analysts
Detail				
For each of the staff titles with technology responsibilities, indicate what percent of their time is spent on each of the functions identified.				
VII. Telephony - (DIAS Only)				
Summary				
1. Does your agency have a dedicated voice cable network?				No
If no, is cabling shared with other data networks?				Yes
If yes, what type of cabling is used? (select one)				4 Pair
2. How is cabling run? (select one)				Direct to closets

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Contact Person	Gary Shumway	Joel Abanes	Larry Faucher	Kevin Kearns
3. Describe any key issues / challenges related to existing phone systems:				King County has a very large voice network, which is complicated to administer and maintain because of the diversity of equipment. The network is 18 NEC PBXs, 6 NEC DRUs, 1 Nortel Option 11 and 6 Fujitsu PBXs which hub to a IMX2400 located at 201 S Jackson St, Seattle and 3 Nortel Options 61s, 12 Nortel Option 11s, 4 Remotes, 8 Norstar ICS, several Norstar DR5 key systems and over 6,700 Centrex lines. Currently King County's ITS Division supports the County's voice communications, voicemail systems, wireless phones and pager services. All Centrex and NEC end users utilize a County owned voice mail service called Digital Sound VS2110. There are over 7,200 users on this system. After 2004, the Digital Sound system no longer will be vendor supported. Consequently, King County will need to migrate to another voice mail system. All other King County end users utilize the Nortel PBXs Meridian Mail. Meridian Mail supports eight sites for the County's Department of Development and Environmental Services (DDES), 1 site at Precinct 2 in Bothell, and a number of stand alone County voice mail systems. The Norstar ICSs has Norstar Voice Mail, which cannot be integrated. The 2,322 wireless phones are contracted out to AT&T Wireless, AirTouch, and Nextel. The pager providers are MetroCall, which supports approximately 2,700 pagers, and Cook Paging which supports approximately 1,100 pagers.ITS is currently doing a broad analysis of the County's telecommunications systems to develop a comprehensive telecommunications plan to provide King County with stable, predictable and affordable telephony service for the next five years.

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Detail				
Provide the following information about your agency's phone system:				
1. Phone system used:				See above
2. Connection lines:				
3. Voice mail system:				All Centrex and NEC end users utilize a County owned voice mail service called Digital Sound VS2110. There are over 7,200 users on this system. All other King County end users utilize the Nortel PBXs Meridian Mail. Meridian Mail supports eight sites for the County's Department of Development and Environmental Services (DDES), 1 site at Precinct 2 in Bothell, and a number of stand alone County voice mail systems. The Norstar ICSs has Norstar Voice Mail.
4. Vendor:				Various
5. Date of install:				Various
6. Support agreement available?				
7. Support agreement in place?				
8. Is VoData being used (VoIP, VoATM, VoHDLC)?				No
9. Is the voice mail system centrally managed?				Yes
10. Manufacturer:				
11. Model:				
12. Software release:				
13. Number of lines:				
14. Network connection (e.g., T1, point-to-point, switched)				

V.   Peer Review Results

As part of the strategic technology planning process, Moss Adams conducted targeted peer reviews to identify best practices being utilized in other public entities as well as private organizations. This effort included identifying potential participants, contacting them to request input, and conducting interviews over the phone with those who agreed to participate. The following agencies/organizations were contacted for inclusion in the process. Those who chose to participate are indicated in bold:

- Cities: **New York**, Dallas
- Counties: **Maricopa**, Multnomah, **Orange**, **San Diego**, **Washington**
- States: California, **Connecticut**, **Pennsylvania**, Texas, **Washington**
- Federal: Singapore
- Private: Weyerhaeuser, Safeco

The following matrix provides the outcomes of this peer review process. The questions fall into the following six categories: organization and staffing; system architecture; efficiency, effectiveness and performance; service delivery; budgeting/funding; and vision. Lessons, themes, and/or trends are identified at the conclusion of each section.

	King County, Washington	Maricopa County, Arizona	Orange County, California	San Diego County, California	Washington County, Oregon	State of Connecticut	State of Pennsylvania	State of Washington	City of New York
Title Date interviewed		CIO 1/7/2002	IS Project Manager 12/10/2001	IT Manager 12/12/2001	Manager GIS and Web Technologies 12/12/01	CTO 12/12/2001	Technology Planning Manager 12/13/2001	Assistant Director Interactive Technologies 12/13/2001	Deputy Commissioner, Technology and e-Gov 12/14/2001
Organization and Staffing									
1. Number of employees in IS department	150	500	400 (200 contract)	330 (prior to outsourcing)	35	350 employees 650 union	22 Operations & technical support is outsourced	400+ in Central Services	3,000
2. Number of users	10,000	15,000	18,000	12,000	1,300	25,000	10,000	60,000	60,000
3. Ratio of government employees to technology staff	60 to 1	30 to 1	45 to 1	36 to 1	37 to 1	25 to 1	N/a	N/a	20 to 1
4. Number of agencies	20	60	26	44	10-15	60	Information not given	100+	130+
5. Type of environment	Decentralized	Decentralized	Decentralized	Decentralized	Centralized	Decentralized, moving towards centralized	Decentralized	Decentralized	Decentralized

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6. Technology management structure	• CIO organization • Central IT organization • Each agency has own IT group	• Enterprise (least amount of autonomy) • Electronic community (common systems) • Department (dept. specific)	• Data center managed by CIO • IT departments within larger agencies	• Most technology is outsourced • CTO manages applications and tele-communications, ERP system	• Systems administration • Client services • Application support	Information not given	• Operations and technical support for mainframe and mid-range systems has been outsourced • Applications and database support is still done in house	• Tele-communications • Computing services (mainframe) • Interactive technologies (Internet and video services)	• Each agency has its own IT department • Three data centers with mainframe
7. Control of Staff Costs	• Proposed by agencies • Approved by budget office currently	• Standardized prices for standard job descriptions, committed to pay 5% behind market midpoint, analyze online planning continuum for agencies.	• Hayes Study – based on skill levels, budget manages staff levels, contract manages outsourced people.	• Managed through contracts with outsourced vendor	• Agencies submit Business Plans to IT for approval, helps gauge infrastructure for the future	• Managed internally within each dept., appropriated by legislator, money is driven by customer needs	• Staffing levels are scrutinized and approved centrally.	• FTE plan that agencies have to adhere to. • Vacancies now and more expected with retirements	• Managed with budget, depends on workload and business requirements, agency specific

Analysis:
- All decentralized environments have core centralized services; usually a data center and Internet support. Decentralization works well for the larger agencies, while a centralized environment is easy to manage for a smaller agency like Washington County.
- All agencies report having trouble retaining skilled employees with government salary levels. Outsourcing options help alleviate this.
- Control of costs, both for staffing and other costs ranged from tight budget controls to a more open structure intended to allow growth.

System Architecture (including web/Internet)

	King County, Washington	Maricopa County, Arizona	Orange County, California	San Diego County, California	Washington County, Oregon	State of Connecticut	State of Pennsylvania	State of Washington	City of New York
8. Mainframe systems and functions they serve	• AN07 = Assessor • ARMS = Finance • MSA = H/R • Law, Safety & Justice • Property Taxes	• One "enterprise server," IBM 0S/390 = Financial and H/R	• CAPS=P/R, H/R, Purchasing • ATS = Tax	• 2 IBM mainframes= Finance, H/R, Law and Justice	• (7) HP9000 Unix minis = Jail management, Financials, GIS, Permitting	• DB2 • IMS server • Sun Systems • Unisys • 2 IBM 9672's	• OS/390 • Unisys Clearpath • AS/400	• IBM • Unisys	• OS/390 (3)
9. Web enabled functions for public	• Largely static pages					• Static web pages			
• Residential Parcels	X	X							X
• Pet Adoptions	X	X	X						
• Court Dockets		X		X				X	

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• Job Applications	X	X	X					X	
• Restaurant Reviews	X	X			X				
• Bid Solicitation	X	X							
• Birth/Death/ Marriage	X		X						
• Board Meetings (listen)	X		X						
• Permitting/Licenses/ Tax	X (State)		X		X	X	X	X	X
• Voter Precinct/Register				X					
• Property Tax	X			X					
• Purchasing/ Contracting				X					
• Consumer protect/complaints						X		X	X
• Traffic/Mapping					X			X	
10. Web enabled functions for employees	• Intranet • Help desk • Benefits • County regulations • Job postings • Budget • Employee newsletters • Employee list/ contact info • Online polls	• Intranet • Agenda central = Board approval electronic • EBCTV = electronic business center TV, internal channels for training, presentations, etc. • Extranet (contractor openings, PC purchasing, office supplies	• Intranet • Data warehouse for CAPS (canned queries, ASP pages)	• Intranet, more when ERP rolls out	• Intranet, more interactive when ERP is fully implemented	• None	• Intranet	• Procurement • Electronic forms • Technology training • Retirement benefits estimator	• Intranet • Extranet • External hosting

Peer Review Results

Title Date interviewed	King County, Washington	Maricopa County, Arizona CIO 1/7/2002	Orange County, California IS Project Manager 12/10/2001	San Diego County, California IT Manager 12/12/2001	Washington County, Oregon Manager GIS and Web Technologies 12/12/01	State of Connecticut CTO 12/12/2001	State of Pennsylvania Technology Planning Manager 12/13/2001	State of Washington Assistant Director Interactive Technologies 12/13/2001	City of New York Deputy Commissioner, Technology and e-Gov 12/14/2001
11. ERP systems:								None	
• AMS		X	X						
• Integral (HRMS)		X							
• Peoplesoft	X			X		X			X
• Oracle Financials	X			X	X		X		
• SAP							X		
12. Major changes anticipated in next 3 years	• Financial replacement project • Communications convergence • Peoplesoft upgrade • LS&J integration • Expanded e-government services	• Wireless emerging • Electronic learning	• ATM network (more resource intensive applications)	• ERP implementations, • Network more robust (maps, fingerprints)	• Storage Area Network (SAN) • FTP server • Additional web servers • Clerks recording system	• Browser-based applications • Remote access • Cyrix for agencies • Moving applications off of mainframe	• Server consolidation possibly using Linux • Continue web enablement of legacy systems	• Contact management system is being acquired	• Leveraging mainframe environment for more web hosting
13. Key Applications used (if known)						Not known		Too many to list	
• Finance	Oracle / ARMS	AMS	CAPS	Oracle	Oracle		Websphere, CICS		Fairfax
• Human Resources	Peoplesoft/MSA	HRMS	CAPS	Peoplesoft			SAP		Starts
• Law, Safety, Justice	Mainframe			JIMS (in-house)	Tiburon		LEMS		
• Transportation	Various						Websphere, IMS		Medallion
• Public Health	Mainframe		CDS				CICS		
• Roadway Mgmt	Mainframe	Road Runner							
• Assessor	Custom C/S		ATS						
14. Standards for operating systems	• MVS • Unix • NT • Novell	• OS390 • Windows NT/XT • Unix	• ASP (web development standard)	• Outsourced decision	• Windows NT		• Windows 2000	• No published standards, only recommended, flexible for agencies	• NT • Solaris

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Title Date interviewed		CIO 1/7/2002	IS Project Manager 12/10/2001	IT Manager 12/12/2001	Manager GIS and Web Technologies 12/12/01	CTO 12/12/2001	Technology Planning Manager 12/13/2001	Assistant Director Interactive Technologies 12/13/2001	Deputy Commissioner, Technology and e-Gov 12/14/2001
15. Standards for databases	• Oracle • SQL Server • Access • Adabas	• DB2 • Oracle • Informix • SQL Server	• SQL	• Adabas • DB2	• Oracle • SQL Server, • Access	• Oracle • SQL Server • AAX = Peoplesoft • DB2UDB	• Oracle • SQL Server	• No published standards, only recommended, flexible for agencies	• DB2 • Natural • Adabas • Oracle • SQL

Analysis:
- Most of the key applications being used are standard market applications, there are very few in-house applications being used.
- Most of the agencies have multiple platform operating systems and database standards.
- There was a wide range of web-enabled functions throughout the agencies from static information pages to complex interactive updated functions serving employees and the public.

Efficiency, Effectiveness, and Performance

	King County, Washington	Maricopa County, Arizona	Orange County, California	San Diego County, California	Washington County, Oregon	State of Connecticut	State of Pennsylvania	State of Washington	City of New York
16. Methods for optimizing technology	• Domain consolidation (planned) • Use of "off the shelf" systems • Centralized email and Internet web coordination	• Standardizing technology platforms for integration • Convert processes to electronic format • Governance model – right people for efficient planning	• ATM network • Recruitment system	• Information not given	• Centralization model • Manage organization as integrated corporation • Technology allowed to proliferate	• Server consolidation • Ecoscope (passive listening to traffic) • Centralizing servers • Metropolitan network • Fibering for education network for all towns • Standardization of skill sets	• Web enabling legacy systems • Using MQSeries message software to connect disparate systems	• Internet connectivity is very high in WA • Motivation to deliver services over the Internet	• Leveraging existing platforms and applications to web enabled services for government operations and public service delivery
17. Technology cost controls	• Negotiated enterprise software agreement • Use of master contracts	• Standardizations • Leverage high volume purchases (WSCA) • Managing government contracts	• Information systems requests (>$100k) • Low prices locked in with 10 year outsourced contracts • Hardware/software standards	• Contract with CSI for staff	• Agencies submit business plans to IT for approval • Desktop standards	• Architecture Review Board = ½ IT, ½ business managers within agencies review standards. • Central IT approves all consulting dollars and >$20k purchases	• All expenditures and plans must be reviewed and approved by the CIO	• Portfolio management approach, uses analysis of risk matrix, oversight category vs. higher risk, Information Services Board oversees	• None, have been investing in technology • Leveraging enterprise solutions to not replicate existing solutions • Centralized Steering Committee oversees

Peer Review Results

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18. Standards for technology development process	• Governance model – technology management board	• Governance model has 3 tiers: enterprise, electronic community and department level, all have different levels of autonomy	• CIO issues hardware standards	• Information not given	• Information not given	• Information not given	• Reviewed and approved by the CIO, new technology initiatives happen at the Enterprise level	• Board sets policy, agencies work as community to drive price	• None. In process of developing standards, security standards are in place

Analysis:
- Trend toward centralizing specified manageable components.
- Approval and oversight processes are in place to manage costs.
- Technology standards specify different levels of autonomy for departments, agency groups, etc.

Service Delivery									
19. Centralized Help Desk a.) Y/N b.) # of people c.) Tools used	a) Yes b) 5 c) HEAT (customized)	a) Yes b) 6 c) Support Magic and HP Openview for network mgmt.	a) Yes b) 20 (external and internal) c) unknown	a) Yes b) Outsourced through CSI c) unknown	a) Yes b) 2 c) Lotus Notes work order system	a) Yes (in development) b) 30+, outsourced through Compaq c) unknown	a) Yes (in development) b) Part will be outsourced c) Remedy	a) Yes, b) outsourced. c) Infoman (not sure)	a) Yes b) 5-10 c) in-house software
20. Outsourced vendor relationships									
• PC Maintenance		Sentinel	ACS	CSI	Unisys		Microsoft, IBM		
• Data Center			ACS	CSI	Unisys		Unisys		X
• Help Desk			ACS	CSI	Unisys	Compaq	Intellimark	Safe Harbor	
• Application Support		X	ACS	CSI	Unisys				
• Network Management			ACS	CSI	Unisys		Adelphia		
• Digital Certifications								Digital Signature Trust	
• Portal Search Engine								Ask Jeeves	
• Router Management							Verizon		
• Project Work/Short Term		X							

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Title **Date interviewed**		**CIO** **1/7/2002**	**IS Project Manager** **12/10/2001**	**IT Manager** **12/12/2001**	**Manager GIS and Web Technologies** **12/12/01**	**CTO** **12/12/2001**	**Technology Planning Manager** **12/13/2001**	**Assistant Director Interactive Technologies** **12/13/2001**	**Deputy Commissioner, Technology and e-Gov** **12/14/2001**
21. Project management methods	• Project management board – efforts consist of project reviews and monitoring	• Macro level process using ROI and governance model	• Agency level, managed with budgets		• IS management team are project leaders, status reports are submitted to CIO.		• Major projects are funded at an Enterprise level where they can be given the necessary resources and priority	• Standardized, use University of WA PM training methodology	• Use MS Project as tool
22. Software development approach	Varies by agency	• Buy off shelf if possible without customizing, if build, then standardized templates are used (SDLC)	• CMM is standard, MS NT/2000, SQL server		• Unisys has programmers and db administrators, meet with IT managers to determine if s/w is available, if not what is priority, cost and supportability	• Mostly Java technology is used, although very hard to train	• Standards are in place for new server based applications • State wide contract with Microsoft to help with standardization	• Portfolio approach, determine if in-house, outsourced, or contractor	• Determine if resources are available in house, if not seek outside support

Analysis:
- Agencies use either an ROI approach to looking at software development or a rigid approach to keep costs low.
- Limited use of project management methodology.
- Centralized help desk is the rule; requires standardized service delivery agreements. Based on staffing of this function, most help desks appear to serve a limited, central services function.

Budgeting/Funding

	King County, Washington	Maricopa County, Arizona	Orange County, California	San Diego County, California	Washington County, Oregon	State of Connecticut	State of Pennsylvania	State of Washington	City of New York
23. Technology budgets development	• Agency developed • Form for each technology project • Reviewed through governance process with recommendation by CIO and Executive Budget Office • Form for each operating budget	• Standardized process, online planning continuum, electronic communities set priorities for themselves, work with Board for central technology funding	• Budget is tied to business plan, 5 year strategic plan – published corporately		• Based on future projects and needs through strategic plan, 3-5 year picture		• Some projects are funded at the enterprise level with a technology investment program that provides seed money for important projects	• Portfolio management approach	• On agency-by-agency basis. Strategic plan with cost estimate goes to the Technology Steering Committee for approval

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24. Revenue generating technology outside of licenses/permits	• INET • Title companies	• GIS data to other jurisdictions • Telecommunication department sells two way radio communication	• None	• None	• Title companies pay for real time access to mapping systems • Gives METRO GIS data that they resell as packaged CD product that includes other County information	• None externally • Prisoner phone calls • PBX and phone design for agencies = $65M/year	• None	• None	• None

Analysis:
• Technology budgets appear to be available and tied to strategic plans.
• Very limited revenue generating technology.

Vision – Overall Technology

25. Technology vision		• "Information Technology will champion Maricopa County into Information Age Government"	• Not formalized • Steering committee drives vision	• Not formalized • Emphasis on moving to web	• Not formalized	• Website	• Website	• Website	• Website

Analysis:
• Trend is for providing services, "online instead of in line."
• Limited exploration of revenue generating opportunities.
• Technology vision does not appear to drive technology management; many respondents could not identify the vision or provide clear instructions for accessing it on the web site.

VI. Measurement Report

A. Context

As part of the strategic technology planning process for the County, Moss Adams observed that the County is still in the process of defining and implementing performance measurement tools for managing technology implementation and utilization. This performance measurement report has been prepared to establish a future framework that the County can consider and move towards for adopting best practices for approval, monitoring, and management of technology investments. The intent is to define the major elements of best practices, as well as provide sample conceptual forms that the County can build from for instituting future performance measurements tools. The performance measurement report is not intended to provide detailed procedures that project managers can use in a turnkey fashion for proposing projects or for providing monitoring information to the Office of Information Resource Management-Project Management Office.

B. Purpose

The purpose of performance measurement is to establish a standard framework for proposing, approving, implementing and maintaining technology investments, as well as to ensure that the forecasted benefits and value of the technology investments are realized. Once a comprehensive performance measurement framework is in place, the County will be able to use it as a tool for (a) defining the value and benefits expected from a technology project, (b) monitoring project implementations to ensure that issues are effectively managed to keep a project on track, (c) evaluating performance of project managers and programs in deploying technology, (d) assessing whether the County management and use of technology is aligned with the Strategic Technology Plan, and (e) computing total cost of ownership.

The critical concepts and steps are to:

(1) Define and analyze the business case, including the total cost of ownership, for individual projects before the projects are approved and funded, as well as for the Countywide technology budget.

(2) Measure forecasted outcomes against actual outcomes for projects during implementation, upon their completion, and later, when the project values are realized.

(3) Measure forecasted outcomes against actual outcomes for the Countywide budget based on the technology vision, goals, objectives, strategies, and established measurement criteria.

The development and measurement tools are for use with information technology investments involving new installations, major enhancements, and replacements of existing systems. For these purposes, information technology is defined as desktop computers, servers, networks and cabling, software, databases, applications, telephony, wireless communication, interfaces, peripherals (printers, scanners, etc.), and support and maintenance services. The definition of information technology does <u>not</u> include embedded systems such as computers that control engines, elevators, pumps, etc.

C. Measurement Principles

In order to institute a standard and manageable set of performance measurement tools, it will be important to first establish a foundation of guiding principles as presented below.

1. Keep the measurement tools simple to administer and cost effective to manage
2. Develop tools that are scalable for project, Program, and Countywide use
3. Synchronize the framework to the County's accounting and budgeting systems
4. Establish a definitive business case for each major technology project
5. Maintain consistency with County strategic goals and objectives
6. Incorporate alternatives and feasibility analyses into the decision-making process
7. Consider tangible quantitative and qualitative factors as part of cost/benefit analysis
8. Account for lifecycle costs and total cost of ownership
9. Incorporate risk assessment and management in the approval process
10. Link cash flow payments for a project to measurable performance outcomes
11. Measure outcomes for individual projects and the Countywide budget
12. Refine measurement and forecasting methods over time

These guidelines have been designed to be flexible so they can accommodate the unique needs of decentralized computing operations in departments, offices, and Programs throughout the County.

D. Components

Performance measurement should be structured so that funding is associated with clear and defined projects and performance outcomes can be measured throughout the lifecycle of the projects. Several sample forms have been included to illustrate the concepts the County should consider in improving its existing performance measurement Program. This section describes the project lifecycle and the measurement opportunities at various lifecycle stages, as well as introduces the concept of total cost of ownership.

1. Technology Lifecycle

The foundation of measurements should be built on a project lifecycle model as defined by best practices that can be applied by the County. There are four major phases to be considered within the technology lifecycle: (1) Project Planning, (2) Project Development, (3) Implementation, and (4) Production. Each step is structured to incrementally assemble the necessary information for making good decisions about whether to continue work on the project, and to ensure that the technology is deployed appropriately for the County. A brief description of each phase in the technology lifecycle is presented below.

Phase 1 - Project Planning. This phase should be where a project is conceived and subsequently documented in a proposal to define the project objectives and business value, as well as an initial analysis of costs, benefits, complexity, risks, and resource requirements. The extent of upfront documentation should vary depending on the size, complexity, and/or risk of the project. If the project has sufficient complexity, risk, or budget implications then the proposal will need to be prepared using most, if not all, the categories in the Project Proposal Form. Based on the merits of the proposal, the project could be

approved for preliminary funding to perform more detailed requirements, alternatives and feasibility analyses, in addition to computing the total cost of ownership.

Phase 2 - Project Development. More complicated projects will require significant financial and staffing resources, and will involve a higher level of risk for the County. Therefore, it will be important to strengthen and refine the business case for the project before acquisition, implementation, and maintenance funding is granted. To support the approval and funding of the implementation and production budgets for the project, the detail in the Project Proposal Form will need to be expanded to include additional research appropriate in the following areas:

- *Requirements Analysis* – The project requirements represent the foundation for the project business case. Technical staff will need to work with end users to clarify data, functional and reporting requirements, as well as system workflow needs. Where appropriate, intra and interagency participation will be required to ensure the full scope of the project is defined. In addition to supporting the business case, the requirements are also used as the basis for the alternatives/feasibility analyses of the various solution options.

- *Alternatives Analysis* – The viability of and appropriate approach for the project are to be determined by analyzing alternative solutions and considering whether the preferred approach is practical and realistic to pursue. This component of the business case should evaluate the strengths and weaknesses of each alternative, as well as the duration of the project, resource requirements, risk factors, and possible fatal flaws. Each alternative should then be placed side-by-side so that the tradeoffs of each approach can be compared. It should be remembered that "no change" can be a reasonable alternative that should be considered.

- *Total Cost of Ownership* – The final aspect of developing the business case will be to weigh the costs expected to be incurred against benefits potentially gained from the project. The costs are to include all capital and operating expenditures necessary to acquire, implement, and maintain the system. In contrast, benefits should reflect quantitative tangible and intangible gains expected from the project, as well as qualitative factors that might impact the "go/no go" decision. By defining the total cost of ownership, it will be possible to compute the break-even period and return on investment. The total cost of ownership for each alternative should be developed so that the cost impact of trade-offs in approach can be understood and evaluated.

Phase 3 - Implementation. Once funding for the project has been approved the County will need to establish phased funding release milestones as the project progresses through the acquisition, system preparation and implementation. By releasing funds based upon the performance of the project team and the achievement of project goals and measures, the County will be able to monitor the project implementation and apply resources only when the intended value is likely to be achieved. Status Reports are to be used as the primary tool to document the progress towards meeting the stated project objectives from the Project Proposal Form during implementation.

Before proceeding with the implementation, the County must refine systems requirements to support issuing of an RFI/RFP, review responses, conduct demonstrations with selected vendors, and complete due diligence with the apparent finalist (including reference checks, site visits, and hands-on testing). To ensure the proper foundation is in place for a successful implementation, the County should clarify the hardware requirements, scope potential modifications and customization, negotiate the hardware/software and service contracts, develop the implementation plan, organize the implementation team, and provide preliminary training for the implementation team.

County personnel should then work with the appropriate vendors and supplemental staff to deploy the new technology. At a minimum, the implementation should entail site preparation, system hardware and software installation, setup and configuration, data conversion, prototyping, workflow reengineering, documentation, report development, integration, training for technical and end users, preliminary and final acceptance testing, cutover, and go-live.

Once the implementation has been completed the County should assess the management of scope, resources, tasks, budget, and risk during the project. This should be accomplished with a Post Project Review. The form is to be used to report back on the results from the implementation and to state the reason and impact for any variances that were encountered.

Phase 4 - Production. The implemented technologies will need to be supported and administered while in use by the County. This includes maintaining the systems and underlying architecture, keeping releases and business procedures current, troubleshooting, training new users, and taking the necessary steps to ensure the vitality of the new system.

As part of the production phase, the County should assess whether the project was able to achieve the expected benefits and value that were anticipated for the project. The Value Measurement Review will provide a report on the quantitative and qualitative results realized over time by the completed project. This should include whether the value propositions were achieved, and whether the actual outcome measurements of the project met or exceeded expected outcomes established during the planning and development phases.

2. **Measurement**

It is recommended that the County measure outcomes at both the project level and in aggregate at the Program and Countywide levels. This approach will allow the County to assess the results of individual technology initiatives, as well as determine the total cost of ownership, associated risk, and return on investment of the County's complete technology portfolio.

Project Measures. Performance outcome measurement tools have been discussed in the previous section in the context of the project lifecycle. The measurements are to be initially defined using the Project Proposal Form, and refined in more detail and specificity moving from the project planning to the project development phase. The measurements should be assessed during project implementation using Status Reports, and at project completion through the Post Project Review. Once the implemented technology has been in production for a reasonable period of time, it will then be possible to examine the quantitative and qualitative results of the implementation against the expected outcomes. Each stage of measurement will allow the County to determine whether planned outcomes were achieved, and if not, to determine why the variance occurred and what the impact is on the overall success of the project. An overview of the measurement stages is presented below.

Exhibit 1
Project Measurement Stages
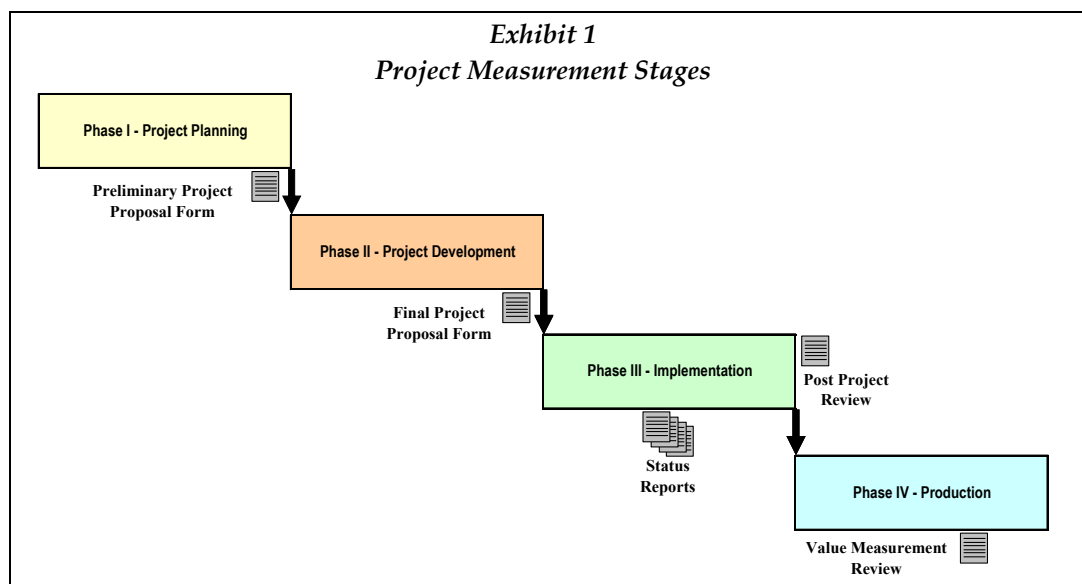
The specific details on each of the project measurement stages and corresponding tools shown above are defined in greater detail in the section entitled Project Measurement Tools.

Program and Countywide Measures. The County will combine the individual technology initiatives for each Program to determine the Program level technology budget and overall outcome performance. Similarly, the Programs should be aggregated to view technology management at a Countywide level. Such a holistic approach will enable the County to measure adherence of technology initiatives to the stated vision, goals, objectives, and standards contained in the Strategic Technology Plan. At the same time, it will allow analysis of the total cost of ownership for technology used within the County and a means to measure improvements in the future. For purposes of Program and Countywide measures, the County should measure improvements across the technology project portfolio by management of individual cost categories, achievement of specific benefits, and compliance with the Strategic Technology Plan.

3. **Total Cost of Ownership**

By establishing performance measurement tools, the County will finally be in a position to (1) define the entire Countywide technology investment portfolio, and to (2) analyze the value and benefits of individual projects as well as the overall portfolio. A key component to having visibility to the complete technology investment portfolio will be the ability to compute the total cost of ownership.

Total cost of ownership accounts for all the expenditures associated with each project throughout the entire project lifecycle, and allows analysis of the costs in multiple dimensions. Typical dimensions that the County will find of value for the effective and efficient management of the technology investment portfolio include viewing costs by:

- Individual technology project
- Cost categories (as defined in the Cost/Benefit Analysis section of the Project Proposal Form)
- Cost categories attributed to the four project lifecycle stages
- Projects as summarized at the Program level
- Aggregate of all projects at the Countywide level

The following diagram depicts the various dimensions that comprise total cost of ownership for the technology investment portfolio.

Exhibit 2
Total Cost of Ownership
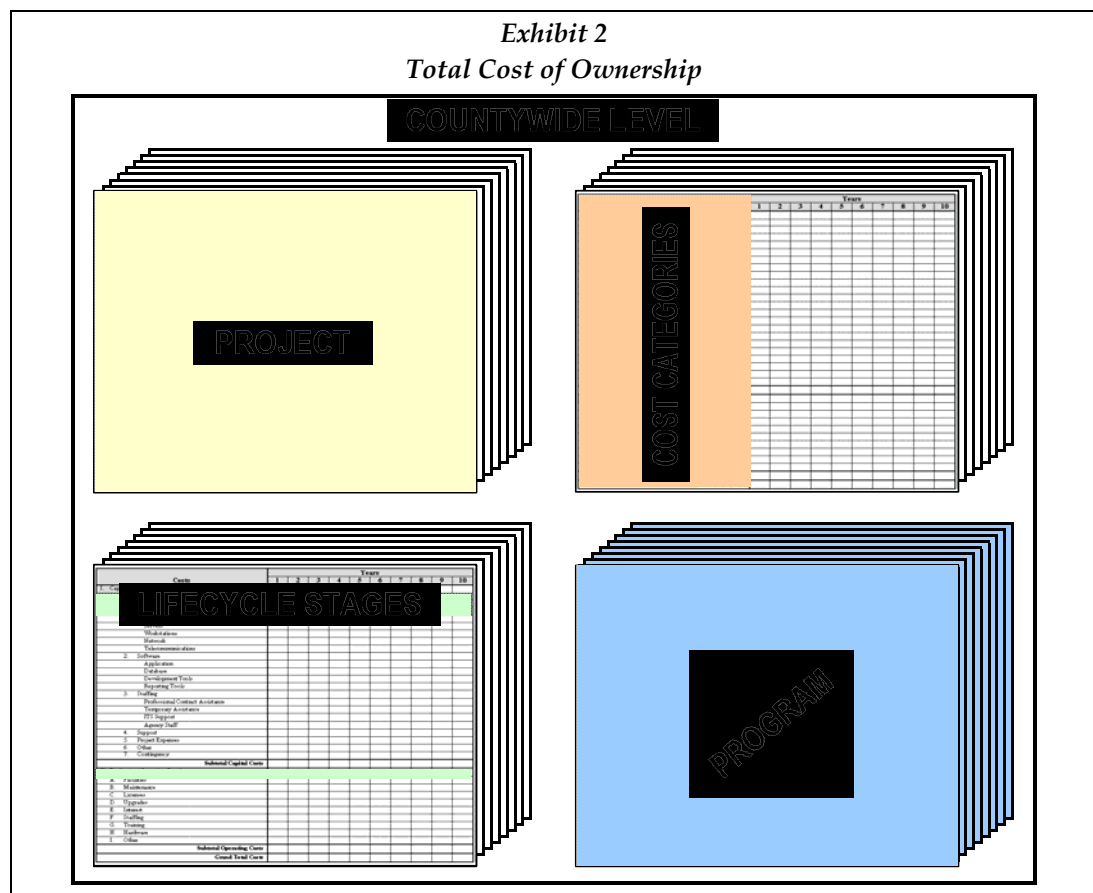
The Project Proposal Form will allow the County to establish expectations for the cost categories that contribute to the total cost of ownership. The information to compile the total cost of ownership is contained in the Cost/Benefit Analysis section of the Project Proposal Form. By collecting this information in the planning stages of a project, the County will be able to determine how the project will impact the technology investment portfolio as well as the potential for risk and forecasted return on investment.

As part of the Project Proposal Form, the Alternatives Analysis section will permit the County to evaluate how different alternative solutions for a given project will impact the total cost of ownership. Therefore, the County will be able to make an informed decision about how to best proceed with the project, and to understand the resulting implications upon the technology investment portfolio.

The Status Report, Post Project Review, and Value Measurement Review will allow the County to (1) monitor actual expenditures throughout a project's lifecycle, and (2) assess the return on investment based on actual realization of defined values and benefits established within the Project Proposal Form. The costs can be analyzed in a variety of ways by summarizing actual performance results by project, by project lifecycle stages, by cost categories across projects, by Program, and for the entire County.

By looking at the total cost of ownership for technology investments over their entire project life, it will be possible for the County to recognize that there are upfront costs associated with selecting and implementing an initiative, as well as in administering the technology over time. For instance, the initial software licenses for a system must be renewed each year through licensing and maintenance fees to keep the system upgraded and current. Similarly, if it is expected that the user count will increase over time as more employees benefit from the system, the additional license costs and increased maintenance fees need to be accounted for when defining the total costs of ownership. As another example, when an initiative involves customization it will be important for the County to account for not only the upfront costs associated with developing the customization, but also the recurring costs required to maintain the customization as new system upgrades are deployed.

To help facilitate the various total cost of ownership computations, the County will need to assess the capabilities of the accounting and budgeting systems. The result should be to tailor the existing systems to support the mechanics of data collection, and to use project performance records to supplement the process.

E. Specific Measures

Outcome measurements should be considered from various perspectives including while a technology initiative is in the process of being implemented, once the project has been completed, and later when the ability to achieve stated value propositions can be assessed. At the same time, projects should be measured collectively by Program and across the entire County. As a result, there are expected to be two categories of measurements: (1) project-specific measures and (2) the Program and Countywide summary measures. The remainder of this section defines both types of measurement categories and identifies general measurement criteria that may be used for each technology initiative. It is expected that the measurement criteria will be applied in more detail specific to the circumstances of each project.

1. Project Measures

Project measures should be classified according to their application throughout the technology lifecycle. Various stages of the technology lifecycle that are considered for each project include project implementation, project completion, and realization of project objectives.

Implementation. Status Reports should be used to document the progress of a project during implementation. In addition to indicating the *interim* status of the project budget, schedule, tasks, and scope, the Status Report is to be used to report on the following types of project measures:

- Business objectives achievement
- Scope management
- Tasks and milestone completion
- Project schedule management
- Impact management on organization and other entities
- Risk identification and mitigation
- Staff utilization
- Budget tracking

Completion. Once the project has been completed, the final step will be to document the results within the Post Project Review. The Post Project Review should represent the accumulation of all the status reports and communicates the final standing of the project budget, schedule, tasks and scope. At the same time, the Post Project Review should document the *final* results of the completed project based on the following project measures:

- Business objectives achievement
- Scope management
- Tasks and milestone completion
- Project schedule management
- Impact management on organization and other entities
- Risk identification and mitigation
- Staff utilization
- Budget tracking

Realization. Technology initiatives should be undertaken to achieve specific goals and outcomes. The purpose of the realization measures is to assess whether the outcomes were attained and whether they were achieved to the extent expected. Using the Value Measurement Review, the County can evaluate general initiative outcomes to determine whether the project accomplished results such as:

- Achieved full value of expected benefits
- Remained consistent with lifecycle cost estimates
- Achieved defined objectives
- Cost savings
- Cost avoidance
- Eliminated operating fees
- Reallocation of staff time
- Streamlined workflow
- Efficiency improvements
- Automated manual processes
- Improved inquiry/reporting
- Integrated systems
- Eliminated redundancies
- Met legislative mandates

2. **Program and Countywide Measures**

Each year the County should evaluate whether the performance of the Programs and the County in using and implementing technology was consistent with the vision, goals, objectives, and strategies of the Strategic Technology Plan, as well as standards established by the technology governance bodies. This evaluation should be accomplished by preparing Report Cards. The intent of the Program and Countywide measures is to reaffirm the Strategic Technology Plan and to avoid encouraging stovepipe behavior among the County agencies. Some of the key measures that are presented as part of the Report Card are:

- Consistency with technology vision and guiding principles
- Adherence to technology strategies
- Value recognition
- Continuous refinement and improvement
- Management of technology initiatives portfolio
- Project results
- On-time completion
- Staff utilization
- Staff performance
- Implementation budget management
- Production budget management

F. Project Measurement Tools

The measurement tools to be used to support individual technology initiatives are comprised of the Project Proposal Form, Status Reports, Post Project Review, and Value Measurement Review. These four tools allow for monitoring and management of an initiative throughout the project lifecycle. This section provides an overview of how the four project measurement tools interrelate and defines the core components of each tool. Each tool is presented with a brief description of its purpose, identification of the preparer and key users of the form, expectations for when the tool is used, and a summary of the tool. Examples of each measurement tool form are found in the Appendix.

1. Overview

The project measurement tools should interrelate to incrementally define outcome measurement expectations in the project planning and development phases, and then to monitor and analyze actual outcomes during the implementation and production phases. The various sections of the measurement tools should correspond to key measurements that are to be tracked and managed during the project lifecycle.

The Project Proposal Form is to be used to establish expected performance measures for each project. Consequently, this tool should be used during the project planning and project development phases of the project lifecycle. The remaining measurement tools can then be used to benchmark actual performance and outcomes against expectations. Presented below is an overview of the relevant measurements associated with the Project Proposal Form.

Tool:	Project Proposal Form
Lifecycle Phase:	Project Planning and Development
Section of Measurement Tool	**Relevant Measurement**
Business Case	Expected Value Propositions (and Qualitative Benefits)
Work Plan and Schedule	Expected Work Plan and Schedule
Staffing	Expected Staff Utilization
Cost/Benefit Analysis	Expected Costs and Quantitative Benefits
Risk Assessment	Expected Risk Factors and Mitigation Strategy
Performance Measures	Expected Outcomes

Status Reports are to be used to track project performance as the technology is being implemented. The actual interim performance of key measures can then be monitored to ensure that each project remains within scope, schedule, and budget. When appropriate, the project team can then take corrective action to resolve potential issues impacting the outcome of the project before they jeopardize the overall project. An overview of the Status Report tool is shown below.

Tool: Lifecycle Phase:	Status Report Implementation (In Process)	
Section of Measurement Tool	**Relevant Measurement**	
Status of Hours	Actual Scope Management and Staff Utilization (Interim)	
Status of Dollars	Actual Implementation Costs (Interim)	
Completed, Current and Upcoming Tasks	Work Plan and Schedule Management	
Change in Risk Assessment	Actual Risk Management	
Status of Measures	Actual Value Propositions and Outcomes (Interim)	

In comparison to Status Reports, the Post Project Review should be used to assess final measurement outcomes once a project has been fully implemented. Such a review will allow the County to maintain a record of how well the project was conceived and executed. Variances can then be analyzed to refine future planning and estimates can be made to support continuous improvement in how technology is deployed. The Post Project Review should rate the overall results of the project against predefined project implementation evaluation criteria. A synopsis of the Project Review Form and the relevant measurements are presented below.

Tool: Lifecycle Phase:	Post Project Review Implementation (Upon Completion)	
Section of Measurement Tool	**Relevant Measurement**	
Schedule Summary	Actual Staff Utilization, Work Plan, and Schedule Management	
Budget Summary	Actual Implementation Costs (Final)	
Measurement Completion Summary	Actual Outcomes	
Project Ratings	Project Score (Aggregate scores are used for Report Cards)	

The final project measurement tool should be the Value Measurement Review. The tool is to be applied once the implemented technology has been in production for sufficient time to assess the extent that value propositions and outcomes were achieved. The review should be used to capture actual production costs in comparison to expectations, as well as to evaluate whether value propositions, quantitative benefits and outcomes were realized. Finally, the Value Measurement Review should score the project using predefined outcome measurement criteria. Presented below is an overview of the relevant measurements associated with the Value Measurement Review.

Tool:	Value Measurement Review	
Lifecycle Phase:	Production	
Section of Measurement Tool	**Relevant Measurement**	
Production Cost Status	Actual Production Costs	
Realization Summary	Actual Value Propositions, Quantitative Benefits, and Outcomes	
Measurements Ratings	Measurement Score (Aggregate scores are used for Report Cards)	

The Project Ratings (from the Post Project Review) and the Measurement Ratings (from the Value Measurement Review) are to be aggregated to establish the Program and Countywide Report Cards. The Report Cards will provide the ability to assess how effective individual Programs and the County are at deploying and utilizing technology. In addition, the Report Cards will establish the information necessary to track total cost of ownership for technology. A summary of the relevant measurements monitored as part of the Program and Countywide Report Cards is shown below.

Tool:	Program and Countywide Report Cards	
Lifecycle Phase:	Production (Annually)	
Section of Measurement Tool	**Relevant Measurement**	
Project Portfolio Performance	Annual Performance Compared with Strategic Technology Plan	
Project Ratings Performance	Average Project Ratings for All Projects	
Measurement Ratings Performance	Average Measurement Ratings for All Projects	

2. **Project Proposal Form**

A brief description of the purpose of the Project Proposal Form, identification of the preparer and key users of the tool, expectations for when the tool is used, and a summary of the Project Proposal Form are presented below. It is expected that the County will establish a simplified derivative of the Project Proposal Form for technology initiatives that are smaller, less complex, and have limited budget implications.

Objective: The Project Proposal Form will be used to establish the business case and funding request for technology projects. Projects that have sufficient complexity, risk, or budget implications will need to provide more details than smaller, less complex, less risky projects. After the project has been completed, the outcome measurements defined within the Project Proposal Form can be used to assess the overall success of the project and the extent to which outcomes and value propositions were realized.

Preparer: Program management representative who has identified the technology initiative and will sponsor the assembly of the project submittal. For larger, more complex projects, a project manager should be involved in the write-up.

Key Users: Review of proposed technology project initiatives is to be completed by the appropriate technology governance bodies in conjunction with the Budget Office.

Timing: Initial completion of the Project Proposal Form should be done during the Project Planning phase to obtain approval to proceed with further analysis and project development. Final and comprehensive completion of the Project Proposal Form should be accomplished during the Project Development phase to determine that a sufficient business case exists for approving the acquisition and implementation of the project.

Summary: Presented below is an overview of the major sections that should comprise the Project Proposal Form.

A. Project Summary
- Project Description
- Existing Condition and Anticipated Changes
- Impact
- Project Duration
- Staff Requirements
- Total Cost of Ownership
- Key Measures
B. Business Case
C. Business Plan Alignment
D. Impact
E. Work Plan
F. Schedule
G. Staffing
H. Cost/Benefit Analysis
I. Budget Sources
J. Risk Assessment
K. Alternatives Analysis
L. Performance Measures

3. **Status Report**

A brief description of the purpose of the Status Report, identification of the preparer and key users of the tool, expectations for when the tool is used, and a summary of the Status Report are presented below.

Objective: The Status Report will be used by the implementation team to monitor that a technology project remains in scope, milestones and tasks are being completed, and the project remains within budget, as well as to efficiently manage staff utilization and to mitigate risk.

Preparer: Project Manager responsible for the implementation of the technology initiative.

Key Users: Independent monitoring of the project's scope, schedule and budget will be done by the Office of Information Resource Management-Project Management Office in conjunction with the Project Review Board.

Timing: Status Reports are to be prepared monthly by the Project Manager and provided to the Office of Information Resource Management-Project Management Office based on a defined monthly schedule.

Summary: Presented below is an overview of the major sections that should comprise a Status Report.

  A. Project Status Narrative
  B. Status of Hours and Dollars
  C. Completed Tasks
  D. Current Tasks
  E. Upcoming Tasks
  F. Change in Risk Assessment
  G. Status of Measures

4. **Post Project Review**

A brief description of the purpose of the Post Project Review, identification of the preparer and key users of the tool, expectations for when the tool is used, and a summary of the Post Project Review are presented below.

Objective: The Post Project Review will be used as a final assessment for each completed technology project. The review will consider whether project objectives were achieved, scope was managed, milestones and tasks were completed on time and without issues, work was completed within budget, affiliated organizations and entities were not unexpectedly or unnecessarily impacted, risks were managed and/or mitigated, and staff were effectively utilized. Any variances are to be accounted for and the associated impacts analyzed, and insights that can be used for similar future projects are to be documented.

Preparer: Project Manager responsible for the implementation of the technology initiative, with independent assistance of a representative from the Office of Information Resource Management-Project Management Office.

Key Users: Independent monitoring of the results from completed project implementations should be conducted by the Office of Information Resource Management-Project Management Office in conjunction with the Project Review Board.

In addition, the Program that originally sponsored and is ultimately responsible for the project should use the feedback from the Post Project Review to monitor the Program's ability to manage and deploy technology over time to meet the goals of the Program. The Post Project Reviews for the Program are to be aggregated to support the Program's annual Report Card.

Timing: The Post Project Review should be prepared once the project implementation has been completed to summarize the final status and results of the project.

Summary: Presented below is an overview of the major sections that should comprise the Post Project Review.

- A.   Project Objectives Accomplished
- B.   Project Objectives Not Accomplished
- C.   Schedule and Budget Summary
- D.   Explanation of Variances
- E.   Measurement Completion Summary
- F.   Project Ratings
- G.   Lessons Learned

5.   **Value Measurement Review**

A brief description of the purpose of the Value Measurement Review, identification of the preparer and key users of the tool, expectations for when the tool is used, and a summary of the Value Measurement Review are presented below.

Objective: The Value Measurement Review will be used to analyze whether the outcome measures and value propositions promoted as part of the business case contained in the Project Proposal Form were actually achieved. The review should focus on management of ongoing production costs, realization of expected outcomes and value propositions, an explanation of variances, and insights that can be used for similar future projects.

Preparer: The Office of Information Resource Management-Project Management Office in conjunction with representatives from the sponsoring Program of the project initiative.

Key Users: Independent monitoring of the ability to achieve planned outcomes and value propositions for completed project implementations should be conducted by the Office of Information Resource Management-Project Management Office in conjunction with the Project Review Board.

In addition, the Program that originally sponsored and is ultimately responsible for the project should use the feedback from the Value Measurement Review to monitor the Program's ability to manage and deploy technology over time to meet the goals of the Program. The Value Measurement Reviews for the Program are to be aggregated to support the Program's annual Report Card.

Timing: The Value Measurement Review should be prepared once sufficient time has elapsed after implementation completion to allow measurement of the extent to which outcomes and value propositions were realized. For smaller projects this may be a period of as little as three to six months. For larger and more complex projects, when the period could be multiple years in duration, the Value Measurement Review can be prepared incrementally over time to assess the impact of the complete initiative over time.

Summary: Presented below is an overview of the major sections that should comprise the Value Measurement Review.

    A. Production Cost Status
    B. Realization Measurements Summary
    C. Explanation of Variances
    D. Measurements Ratings

G. *Program and Countywide Measurement Tools*

The performance of each Program in implementing and managing technology is monitored each year. Program performance is determined by assessing the outcome of each project for which the Program has been responsible. Such accountability allows the County to ensure that the capabilities of each Program's management to deploy technology can be improved and refined over time based on lessons learned in the past.

Similarly, the performance of the County can be determined by combining the results of all projects. Such an aggregate perspective enables a Countywide snapshot of how effective technology has been deployed. By examining the Countywide measurements, King County has the ability to monitor and manage the entire County technology portfolio in an effective and efficient manner.

The Report Card is presented with a brief description of its purpose, identification of the preparer and key users of the form, expectations for when the tool is used, and a summary of the tool. An example of the Report Card measurement tool is found in the Appendix.

Program and Countywide Report Cards

A brief description of the purpose of the Program and Countywide Report Cards, identification of the preparer and key users of the tool, expectations for when the tool is used, and a summary of the Program and Countywide Report Cards are presented below.

Objective: The Program and Countywide Report Cards will be used to assess how effective each Program and the entire County are at implementing and utilizing technology to meet business goals and objectives. The established Project and Measurement Ratings should be based on predefined criteria to enable a uniform method of scoring. The scores are to be used as a basis for comparing technology deployment and management throughout the County in annual intervals.

Preparer: Office of Information Resource Management-Project Management Office in conjunction with representatives from the Program that sponsored the project initiative. The Office of Information Resource Management-Project Management Office should assemble the Countywide Report Card.

Key Users: Independent monitoring of Project Ratings and Measurement Ratings for completed project implementations should be conducted by the Office of Information Resource Management-Project Management Office in conjunction with the Project Review Board.

Timing: The Program and Countywide Report Cards should be completed annually. The Report Cards are to be compared from year to year in order to determine changes in technology management and utilization over time.

Summary: Presented below is an overview of the major sections that should comprise Program and Countywide Report Cards.

    A. Project Portfolio Performance
    B. Project Ratings Performance
    C. Measurement Ratings Performance

H. Form Samples

Examples of the measurement tool forms described throughout the Performance Measurement document are presented as part of this section.

- Project Proposal Form
- Status Report
- Post Project Review
- Value Measurement Review
- Report Card (used for each Program and Countywide)

King County
Technology Initiative
Project Proposal Form

Project Name:	
Agency:	
Sponsor:	
Submitted by:	**Phone:** **E-mail:**
New or Existing Project:	
Duration (months/years):	
Budget:	
Budget System Ref. #:	

PROJECT SUMMARY

Project Description:
Provide a brief description of the project, including the purpose and reason for the project. In addition, describe the existing situation and the anticipated changes that will occur as a result of this project.

Existing Situation and Anticipated Changes:

Impact:
Identify the entities that will be affected by the project and estimate the impact (low, moderate, high) on each.

Internal - *Other Departments, County Agencies*		**External -** *Other Entities, Public*	
Entity	**Impact Level**	**Entity**	**Impact Level**

Project Duration:
Estimate the beginning and ending dates and the estimated hours required for completion of each task.

Phase	**Begin Date**	**End Date**	**Estimated Hours**

Staff Requirements:
List the staff required for the project and the estimated Full Time Equivalent for each staff.

Phase	**FTEs**	**Staff Requirements (Titles)**

Total Cost of Ownership:
Estimate the budget for each of the major phases rolled up from the Cost/Benefit Analysis.

Project Planning	**Project Development**	**Implementation**	**Production** (Over 10 Years)	**Total**

Key Measures:
List the anticipated measures that will be utilized to gauge success of the project for each of the stages of the Lifecycle.

Implementation	**Completion**	**Realization**

Business Case:
Provide arguments for why the project should be conducted, including qualitative and quantitative benefits. Describe the value proposition of the project.

Business Plan Alignment:
Describe how this project links to the Department Plan and how it relates to objectives of the overall County strategic technology plan.

Impacts:
Identify the entities (internal and external) that will be affected by the project, provide comments on the impact, and estimate the level of impact (low, moderate, high) on each entity.

Internal (*Other Departments, County Agencies*)		
Entity	**Impact Description**	**Impact Level**

External (*Other Entities, Public*)		
Entity	**Impact Description**	**Impact Level**

Work Plan:

Identify and describe the phase and the tasks within the phases that will comprise the project, and who will be responsible for each phase/task.

#	Phase/Task	Responsibility	Description

Schedule:

Estimate the beginning and ending dates and the estimated hours required for completion of each task.

#	Phase/Task	Begin Date	End Date	Estimated Hours

Staffing:

List the staff required for the project and the estimated full time equivalent for each staff.

#	Phase/Task	FTEs	Staff Requirements (Titles)

Cost/Benefit Analysis:

Estimate the monetary costs and benefits for each of the items listed below that are relevant to the project.

Costs	Years									
	1	2	3	4	5	6	7	8	9	10
I. Capital Costs										
A. Project Planning										
B. Project Development										
C. Implementation										
1. Hardware										
Servers										
Workstations										
Network										
Telecommunications										
2. Software										
Application										
Database										
Development Tools										
Reporting Tools										
3. Staffing										
Professional Contract Assistance										
Temporary Assistance										
ITS Support										
Agency Staff										
4. Support										
5. Project Expenses										
6. Other										
7. Contingency										
Subtotal Capital Costs										
II. Production (Operating Costs)										
A. Facilities										
B. Maintenance										
C. Licenses										
D. Upgrades										
E. Interest										
F. Staffing										
G. Training										
H. Hardware										
I. Other										
Subtotal Operating Costs										
Grand Total Costs										

Benefits	Years									
	1	2	3	4	5	6	7	8	9	10
I. Quantitative Benefits										
A. Eliminate Maintenance Fees										
B. Time Reallocation										
C. Streamline Workflow										
D. Efficiency Improvements										
E. Process Automation										
F. Automated Time Entry										
G. Improved Inquiries and Reporting										
H. Automated Reporting										
I. System Integration										
J. Eliminate Subsystems										
K. Eliminate Redundancies										
L. Other										
Total Benefits										

Net Cumulative Costs and Benefits	Break Even (in Years)		Net Present Value	IRR Percentage
	Discounted	Non-Discounted		

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Budget Sources:
Identify the budget sources for the funds, the expected dollar amount from each source, and the specific expenditures to which the funds will be applied by phase/task.

Budget Account	Dollar Amount	Expected Expenditures by Phase/Task

Risk Assessment:
Identify the potential risk factors associated with the project, the risk level for each factor (high, moderate or low) and the anticipated actions/steps to mitigate the risk.

Risk Factor	Risk Level	Mitigation (if Moderate or High risk)

Performance Measures:
Identify the measures that will be utilized to gauge success of the project as well as the expected outcomes for those measures.

Implementation (e.g., Measure- project schedule management, Outcome- tasks completed on schedule)

Measures	Outcome

Completion (e.g., Measure- budget tracking, Outcome- project completed within budget)

Measures	Outcome

Realization (e.g., Measure- minimize manual processing, Outcome- staff time to perform function reduced by 10 hrs/week)

Measures	Outcome

Alternatives Analysis:
For projects greater than $250,000, identify alternative projects/measures, analyze each, and compare them to the proposed project with respect to the strengths, weaknesses, timeframes, resources, costs and risk.

	Proposed Project	Alternative 1	Alternative 2
Strengths			
Weaknesses			
Timeframes			
Resources			
Costs			
Risk			

Attach any supplemental materials used to prepare and support the contents of the Project Proposal Form.
Please provide electronic and printed copies to the Office of Information Resource Management.

King County
Technology Initiative
Status Report

Project Name:	
Agency:	
Report Date:	

Project Status Narrative:
Provide a narrative describing progress-to-date. Identify any unscheduled tasks required, hurdles to overcome, etc.

Status:
Compare the actual hours and dollars spent for each task to the budgeted hours and dollars.

Hours			
Phase/Task	Budget	Actual to Date	Variance

Dollars			
Phase/Task	Budget	Actual to Date	Variance

Completed Tasks:
Identify the tasks completed from the Work Plan since the last status report.

Phase/Task	Comments

Current Tasks:
Identify the tasks currently underway as of this status report, and estimate the percentage complete for each task.

Phase/Task	Comments	Percent Complete

Upcoming Tasks:	
Identify the tasks that are pending initiation or are on hold and determine the status of each.	
Phase/Task	**Comments**

Change in Risk Assessment:		
Describe any changes in risks (either increase or decrease) and identify mitigating actions for each.		
Risk Factor	**Change**	**Action/Mitigation**

Status of Measures:		
For the Measures identified in the Project Proposal Form, discuss the status of each.		
Measure	**Comments**	**Status (Completed, Pending)**

King County
Technology Initiative
Post Project Review Form

Project Name:	
Agency:	
Sponsor:	
Review Date:	
Project Completion Date:	

Project Objectives Accomplished:
Identify and describe the objectives stated during Project Planning and Development that were accomplished during Project Implementation.

Objective	Comment

Project Objectives Not Accomplished:
Identify any objectives that were not accomplished during Project Implementation, and comment on why they were not.

Objective	Comment

Schedule and Budget Summary:
Compare the actual hours and dollars spent for each task to the budgeted hours and dollars.

Hours			
Phase	**Budget**	**Actual to Date**	**Variance**

Dollars			
Phase	**Budget**	**Actual to Date**	**Variance**

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Explanation of Variances:
For each phase or task that did not occur as planned, describe the variation in the project as well as the extent of impact and what the implications of the variance are.

Expected Outcome	Variance	Impact and Implications

Measurement Completion Summary:
For the outcomes identified in the Project Proposal Form, discuss the outcome of each.

Measure	Outcome Description	Met/Unmet

Project Ratings:
For each of the standard measures identified below, rate how well the project team met each (1 – lowest, 5 – highest), and provide comments on each measure.

Measures	Rating	Comments
Business objectives achievement		
Scope management		
Tasks and milestone completion		
Project schedule management		
Impact management		
Risk identification and mitigation		
Staff utilization		
Budget tracking		

Lessons Learned:	
Within each of the project areas listed below, describe any lessons learned.	
Project Area	**Lessons Learned**
Project Planning	1.
	2.
Budget Management	1.
	2.
Scope Management	1.
	2.
Schedule Management	1.
	2.
Issues Management	1.
	2.
Risk Management	1.
	2.
Change Management	1.
	2.
Quality Management	1.
	2.
Communications	1.
	2.
Team Management	1.
	2.
Project Close-Out	1.
	2.
Requirements	1.
	2.
Design	1.
	2.
Development	1.
	2.
Implementation	1.
	2.
Support	1.
	2.
Work Effort Estimating	1.
	2.
Transition to Production	1.
	2.
Testing	1.
	2.
Other	1.
	2.

King County
Technology Initiative
Value Measurement Review Form

Project Name:	
Agency:	
Sponsor:	
Review Date:	
Project Dates:	
Project Cost:	

Production Cost Status:
Compare the dollars spent during the Production phase to the budgeted dollars, and describe the reasons for any variances.

Production Costs	Budget	Actual	Variance	Reason for Variance

Realization Measurements Summary:
For each of the value propositions, benefits, and outcomes identified in the Project Proposal Form, compare the expected outcome with the actual outcome and comment on the reasons for any variances.

Quantitative	
Measure:	
Expected Outcome:	
Actual Outcome:	
Reason for Variance:	
Measure:	
Expected Outcome:	
Actual Outcome:	
Reason for Variance:	
Measure:	
Expected Outcome:	
Actual Outcome:	
Reason for Variance:	

Qualitative	
Measure:	
Expected Outcome:	
Actual Outcome:	
Reason for Variance:	
Measure:	
Expected Outcome:	
Actual Outcome:	
Reason for Variance:	
Measure:	
Expected Outcome:	
Actual Outcome:	
Reason for Variance:	

Explanation of Variances:
For each phase or task that did not occur as planned, describe the variation in the project as well as the extent of impact and what the implications of the variance are.

Expected Outcome	Variance	Impact and Implications

Measurement Ratings:
For each of the standard measures listed below, rate how well the project team met each (1 – lowest, 5 – highest) and provide comments on each measure.

Measures	Rating	Comments
Consistency with technology vision		
Adherence to technology strategies		
Value recognition		
Continuous refinement/improvement		
Technology initiatives portfolio management		
Project results		
On-time completion		
Staff utilization		
Staff performance		
Implementation budget management		
Production budget management		

King County
Technology Initiative
Report Card

Agency Name:	
Report Date:	

Project Performance Portfolio:
List the projects that are comprised within the Program's technology project portfolio, and provide schedule, budget and implementation status information for each. This includes projects that were in process at the beginning of the year, commenced during the current year, or are planned to beginning in the next year.

Projects in Process:
Identify and indicate the Program's implementation performance related to projects that were in process at the beginning of the year.

Project Name	Planned End Date	Actual/Projected End Date	Project Budget	Project To Date Actual	Percentage Complete
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					

Project Name	Planned End Date	Actual/Projected End Date	Project Budget	Project To Date Actual	Percentage Complete
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					
Comments:					

Project Name	Planned Start Date	Actual Expected Start Date	Project Budget	Actual/Expected Budget
Comments:				
Comments:				
Comments:				
Comments:				
Comments:				
Comments:				
Comments:				
Comments:				
Comments:				
Comments:				

Project Ratings Performance:
For each of the project completion measures listed below, average the ratings for the portfolio of projects as rated on the Post Project Review Form, and provide a summary of major issues and observations based on the ratings.

Measure	Average Rating	Comments
Business objectives achievement		
Scope management		
Tasks and milestone completion		
Project schedule management		
Impact management		
Risk identification and mitigation		
Staff utilization		
Budget tracking		
Summary Assessment		

Measurement Ratings Performance:
For each of the value realization measures listed below, average the ratings for the portfolio of projects as rated on the Value Measurement Form, and provide a summary of major issues and observations based on the ratings.

Measure	Average Rating	Comments
Consistency with technology vision		
Adherence to technology strategies		
Value recognition		
Continuous refinement/improvement		
Technology initiatives portfolio management		
Project results		
On-time completion		
Staff utilization		
Staff performance		
Budget management		
Summary Assessment		

Supplemental Materials

In the course of developing the Strategic Technology Plan for King County, a number of supplemental materials were developed. While most of the components of the planning effort now reside in either the Strategic Technology Plan or Appendix, several pieces remain as separate resources to the study. These include (1) a measurement transition plan, (2) technology inventory detail, (3) needs matrix by agency, and (4) a survey matrix by agency. Each of these items are described below and available from OIRM in hardcopy and electronic formats.

Measurement Transition Plan
The Measurement Transition Plan goes hand in hand with the Measurement Report and the preliminary set of project management tools the County developed in 2002 The purpose of this Transition Plan is to define a viable approach for deploying a standard set of outcome measurement tools. The plan identifies the current status of each project management and outcome measurement tool at the time that it was assessed (Spring 2002), defines the extent to which it is being utilized, suggests specific additions and modifications for improvement, outlines steps for Countywide acceptance, and suggests a timeline for the transition.

Technology Inventory Detail
One of the initial efforts in the planning process involved distributing an inventory questionnaire for County staff to submit inventories of the technology components used within their respective agencies. While the summary inventory information is provided as an appendix to the Strategic Technology Plan, the detail resides in the Technology Inventory Detail. Contents of the inventory detail include:

- Servers
- Workstations
- Mobile Data Fax Devices
- Systems Interfaces

- Network Hardware
- Wireless LAN Applications
- Radio Systems
- Staffing

- Peripheral Devices
- Mobile Data Terminals and Applications
- Major Applications

Needs Matrix by Agency
At the end of the fact-finding phase of the Strategic Technology Planning process, an interim milestone deliverable was developed to outline the key issues and needs that were identified through interviews, surveys, inventories, and document review. This served as an abbreviated, bulletized initial outline for the Needs Summary, which now resides in the Appendix of the Strategic Technology Plan.

Survey Matrix by Agency
Technology managers from each agency were surveyed to determine the extent to which existing technologies were meeting current needs. The feedback received provided input to other sections of the Strategic Technology Plan. The survey consisted of two sections: existing conditions, and business requirements/information needs. The content of each section is as follows:

Existing Conditions

- Software/Applications
- Internet/Intranet
- Service Delivery Model
- Training

- Network Infrastructure
- Telephony
- Staffing
- Technology Management
- Documentation

Business Requirements/Information Needs

- Reporting
- Business Practices
- Summary Issues/Needs

Glossary of Terms and Abbreviations

Active Directory — Microsoft's trademarked directory service, an integral part of the Windows 2000 architecture. Active Directory is a centralized and standardized system that automates network management of user data, security, and distributed resources, and enables interoperation with other directories. Active Directory is designed especially for distributed networking environments.

AMS Asset Management System — An application that enables the electronic tracking of selected fixed assets within each facility of an organization.

ASP Active Server Page — A feature of the Microsoft Internet Information Server that incorporates scripts run on the server that uses input received from a web browser.

ATM Asynchronous Transfer Mode — A connection-oriented network technology that uses small, fixed-size cells at the lowest layer. ATM has the potential advantage of being able to support voice, video, and data with a single underlying technology.

Bandwidth — Used to explain (1) how fast data flows on a given transmission path, and (2), somewhat more technically, the width of the range of frequencies that an electronic signal occupies on a given transmission medium. Any digital or analog signal has a bandwidth.

Broadband — Telecommunication in which a wide band of frequencies is available to transmit information. Because a wide band of frequencies is available, information can be multiplexed and sent on many different frequencies or channels within the band concurrently, allowing more information to be transmitted in a given amount of time (just as more lanes on a highway allow more cars to travel on it at the same time).

CDPD Cellular Digital Packet Data - A specification for supporting wireless access to the Internet and other public packet-switched networks. Cellular telephone and modem providers that offer CDPD support make it possible for mobile users to get access to the Internet at up to 19.2 Kbps.

CICS Customer Information Control System — An online transaction processing (OLTP) program from IBM that, together with the COBOL programming language, represents the most common set of tools for building customer transaction applications in the world of large enterprise mainframe computing. CICS has been a standard for the past several decades.

Circuit — A discrete (specific) path between two or more points along which signals can be carried.

CLEC Competitive Local Exchange Carrier — A company that competes with the already established local telephone business by providing its own network and switching.

Client-Server — The model of interaction in a distributed computing system in which a program at one site sends a request to a program at another site and awaits a response. The requesting program is called a client; the program satisfying the request is called the server.

COBOL Common Business Oriented Language — The first widely used high-level programming language for business applications. Many payroll, accounting, and other business application programs written in COBOL over the past 35 years are still in use today.

COM Component Object Model — Microsoft's framework for developing and supporting program component objects.

CORBA Common Object Request Broker Architecture — An architecture and specification for creating, distributing, and managing distributed program objects in a network. It allows programs at different locations and developed by different vendors to communicate in a network through an "interface broker."

Data Warehouse — Specialized databases that use data extracted from other operational systems for reporting purposes.

DBA Database Administrator — A person who directs or performs all activities related to maintaining a successful database environment. Responsibilities generally include designing, implementing, and maintaining the database system; establishing policies and procedures pertaining to the management, security, maintenance, and use of the database management system; and training employees in database management and use.

DBMS Database Management System — A program that lets one or more computer users create and access data in a database. The DBMS manages user requests (and requests from other programs) so that users and other programs are free from having to understand where the data is physically located on storage media and, in a multi-user system, who else may also be accessing the data.

DS3 — A telephony classification of speed for leased lines equivalent to approximately 45 Mbps.

DSL Digital Subscriber Line — A technology for bringing high-bandwidth information to homes and small businesses over ordinary copper telephone lines.

EAI Enterprise Application Integration — A business computing term for the plans, methods, and tools aimed at modernizing, consolidating, and coordinating the computer applications in an enterprise.

E-commerce — The buying and selling of goods and services on the Internet, especially the World Wide Web.

EDM Enterprise Data Model — A high-level view of the data used by an organization. The model focuses on how each piece of data relates to other data in the enterprise, and how business-areas are supported by the various systems and datasets available throughout the enterprise.

ERP Enterprise Resource Planning — An industry term for the broad set of activities supported by multi-module application software that helps a business manage the important parts of its business, including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, and tracking orders. ERP can also include application modules for the finance and human resources aspects of a business.

ETL Extract-Transform-Load — In managing databases, refers to three separate functions combined into a single programming tool. First, the extract function reads data from a specified source database and extracts a desired subset of data. Next, the transform function works with the acquired data - using rules or lookup tables, or creating combinations with other data - to convert it to the desired state. Finally, the load function is used to write the resulting data (either all of the subset or just the changes) to a target database, which may or may not previously exist.

Firewall — A configuration of routers, appliances, and networks placed between an organization's internal network and a connection to the Internet to provide security.

Firmware — Programming that is inserted into programmable read-only memory (programmable ROM), thus becoming a permanent part of a computing device.

FTE Full-Time Employee — Individual who works at least 40 hours per week for an employer.

FTP File Transfer Protocol — The TCP/IP standard, high-level protocol for transferring files from one machine to another

GB Gigabyte — A measure of computer data storage capacity and is "roughly" a billion bytes.

Gigabit — A gigabit is one billion bits, or 1,000,000,000 (that is, 10^9) bits. It's commonly used for measuring the amount of data that is transferred in a second between two telecommunication points.

J2EE Java 2 Platform, Enterprise Edition — A Java platform designed for the mainframe-scale computing typical of large enterprises. J2EE simplifies application development and decreases the need for programming and programmer training by creating standardized, reusable modular components and by enabling the tier to handle many aspects of programming automatically.

LAN Local Area Network — Any physical network technology designed to span short distances (up to a few thousand meters). Usually, LANs operate at tens of megabits per second through several gigabits per second.

LEC Local Exchange Carrier — The term for a public telephone company in the U.S. that provides local service.

Mainframe — An industry term for a large computer, typically manufactured by a large company such as IBM for the commercial applications of Fortune 1000 businesses and other large-scale computing purposes. Historically, a mainframe is associated with centralized rather than distributed computing.

Meta Data — Data that defines other types of information falling into two categories—information that explains data, and information about where and how to get information.

Middleware — A general term for any programming that serves to "glue together" or mediate between two separate and usually already existing programs. A common application of middleware is to allow programs written for access to a particular database to access other databases.

MIPS Millions of Instructions Per Second — A general measure of computing performance and, by implication, the amount of work a larger computer can do.

MOM Message-Oriented Middleware — A client/server infrastructure that increases the interoperability, portability, and flexibility of an application by allowing the application to be distributed over multiple heterogeneous platforms. It reduces the complexity of developing applications that span multiple operating systems and network protocols by insulating the application developer from the details of the various operating system and network interfaces- application programming interfaces (APIs) that extend across diverse platforms and networks.

NAS Network Attached Storage — Hard disk storage that is set up with its own network address rather than being attached to the department computer that is serving applications to a network's workstation users.

.NET — Microsoft's collection of programming support for what are known as web services, the ability to use the Web rather than your own computer for various services. The .NET platform includes servers; building-block services, such as Web-based data storage; and device software.

NOC Network Operations Center — Any organization that manages a network.

Node — In a network, a node is a connection point, either a redistribution point or an end point for data transmissions.

OC-48 — A set of signal rate multiples for transmitting digital signals on optical fiber. OC-48 transmits data at a rate of 2.488 Gbps.

ODBC Open Database Connectivity — An open standard application programming interface (API) for accessing a database.

OLAP On-Line Analytical Processing — Computer processing that enables a user to easily and selectively extract and view data from different points-of-view. OLAP data is stored in a multidimensional database.

PBX Private Branch Exchange — A telephone system within an enterprise that switches calls between enterprise users on local lines while allowing all users to share a certain number of external phone lines.

PDA Personal Digital Assistant — A term for any small mobile hand-held device that provides computing and information storage and retrieval capabilities for personal or business use, often for keeping schedule calendars and address book information handy.

Protocol — A formal description of message formats and the rules two or more machines must follow to exchange those messages.

RAM Random Access Memory — The place in a computer where the operating system, application programs, and data in current use are kept so that they can be quickly reached by the computer's processor.

Relational database — A collection of data items organized as a set of formally described tables from which data can be accessed or reassembled in many different ways without having to reorganize the database tables.

Routers — A special purpose, dedicated network appliance that attaches to two or more networks and forwards packets from one to the other.

SAN Storage Area Network — A high-speed special-purpose network (or subnetwork) that interconnects different kinds of data storage devices with associated data servers on behalf of a larger network of users.

Script — A program or sequence of instructions that is interpreted or carried out by another program rather than by the computer processor(as a compiler program is). A script is sometimes used to mean a list of operating system commands that are prestored in a file and performed sequentially by the operating system's command interpreter whenever the list name is entered as a single command.

SLA Service Level Agreement — A contract between a network service provider and a customer that specifies, usually in measurable terms, what services the network service provider will furnish.

SQL Structured Query Language — A standard interactive and programming language for getting information from and updating a database.

Switch — A network device that selects a path or circuit for sending a unit of data to its next destination.

T1 — The most commonly used digital line in the United States, Canada, and Japan capable of transmitting data at a rate of 1.544 million bits per second. T1 lines use copper wire and span distances within and between major metropolitan areas.

TCO Total Cost of Ownership — A type of calculation designed to help enterprise managers assess both direct and indirect costs and benefits related to the purchase of any technology component.

TCP Transfer Control Protocol — The TCP/IP standard transport level protocol that provides reliable, full duplex, stream service on which many application protocols depend.

Telnet — The TCP/IP standard protocol for remote terminal service. Telnet allows a user at one site to interact with a remote timesharing system at another site as if the user's keyboard and display connected directly to the remote machine.

Unified Messaging — The handling of voice, fax, and regular text messages as objects in a single mailbox that a user can access either with a regular e-mail client or by telephone. The PC user can open and play back voice messages, assuming their PC has multimedia capabilities.

VSAM Virtual Storage Access Method — A file management system for IBM's larger operating systems, including its primary mainframe operating system, MVS, now called OS/390. Using VSAM, an enterprise can create and access records in a file in the sequential order that they were entered.

WAN Wide Area Network — Any physical network technology that spans large geographic distances. Also called long-haul networks, WANs usually operate at slower speeds and have significantly higher delays that networks than operate over shorter distances.

Web Portal — A World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site on an intranet.

Web-Hosting — The business of housing, serving, and maintaining files for one or more web sites.